EC5991

Form Date 4/25/91

ROCKY FLATS PLANT

NATIONAL ENVIRONMENTAL POLICY ACT DOCUMENTATION
ENVIRONMENTAL CHECKLIST

1. Date: May 21, 1991

2. Activity/Project Name: IAG Site Characterization Activities

3. Authorization or EJO: EC5991
   ADS Number (E&WM only):

4. Project PA:

5. Initiating Line Manager: Mike Arndt

6. Project/Activity Description (attach pages if needed):

If possible, do not include any classified or UCNI information with this Environmental Checklist.

Include the following (incomplete ECs will be returned, delaying the review process)

- Total estimated cost,
- Schedule, and drivers for any specific due-dates,
- Quantities, volumes, measures of changes in emissions, effluents, wastes generated,
- Justification of project, referencing laws, DOE Orders, etc,
- Location of project (with maps or figures as helpful).
- Describe , explain, or clarify any checklist items marked "yes", or "unknown"; if "unknown", is there a time when the information will be available?

		Checklist YES	NO	UNKNOWN
7.	Funding:			
A.	Is the project a budget line item? **(seismic survey)**	X	___	___
B.	Is the funding source DOE DP?	___	X	___
8.	Statutes applicable:			
A.	Will the project require or potentially require an application for permit or permit modification under:			
a.	Clean Air Act?	___	X	___
b.	Clean Water Act?	___	X	___
B.	Does the project involve RCRA ?	___	X	___
a.	Will a RCRA permit or modification be required?	___	X	___
b.	Does the project include a RCRA removal?	X	___	___
c.	Does project include RCRA closure?	___	X	___
	- partial? ***(preliminary characterization***	___	X	___
	- full? ***for eventual closure.)***	___	X	___
d.	Does project include excavation or capping?	___	X	
e.	Will cost and duration stay within $2 million and			

REVIEWED FOR CLASSIFICATION/UCNI

By [signature]

Date 1/13/92

	12 months? (Explain in project description.)	___	X	___
C.	Does the project involve CERCLA?	X	___	___
	a. Does project include CERCLA removal?	___	X	___
	b. Will cost and duration stay within $2 million and 12 months? (Explain in project description.) ***(preliminary characterization)***	___	X	___
D.	Does the action threaten to violate statutory, regulatory, or permit requirements, or DOE Order?	___	X	___
E.	Will the action be in a SWMU?	X	___	___
11.	Will this project construct or require a new or expanded waste disposal, recovery, storage or treatment facility?	___	X	___
12.	Is project needed for IAG, AIP, FFCA, or other federal or state agreement? (Specify and explain any schedule urgency and deadlines in project description.)	X	___	___
13.	Is the project:			
A.	new process, building, etc. or	___	X	___
B.	a modification to an existing?	___	X	___
C.	capital equipment/machinery installation?	___	X	___
14.	Location Items:			
A.	Will the project result in, or have the potential to result in, long term changes to the environment?	___	X	___
B.	Will the action occur outside the security zone/ protected area (ie, outside Gate 8 at Post 100 and Gate 10 at Post 900)?	X	___	___
C.	Will the action take place in a wetland or floodplain? ***(sampling)***	X	___	___
15.	Will the project result in changes and/or disturbances of the following existing considerations?			
A.	noise levels	___	X	___
B.	air emissions	___	X	___
C.	liquid effluents	___	X	___
D.	solid wastes	___	X	___
E.	radioactive wastes (including contaminated soil)	X	___	___
F.	hazardous waste	X	___	___
G.	mixed waste (radioactive and hazardous)	X	___	___
H.	chemical or petroleum product storage	X	___	___
I.	water use(withdrawal of groundwater or diversion or withdrawal of surface water)	X	___	___
J.	drinking water system	___	X	___
K.	sewage disposal system	___	X	___
L.	soil movement outside facility fences or beyond SWMU boundaries	X	___	___
M.	site clearing, excavation, or other physical alterations to grade	X	___	___

EC Prepared by: Karen S. Lewis Date: 5/21/91

Organization: NEPA Bldg: Denver West Extension: 273-6005

PROJECT/ACTIVITY DESCRIPTION:

Starting at the end of May 1991 and continuing until at least December 1993, a variety of site characterization activities will take place within several Operable Units (OU 1, OU 2, OU 5) on the Rocky Flats Plant (RFP). These project activities will involve preliminary characterization for eventual closure for RCRA areas, and preliminary characterization for CERCLA areas and ongoing programs to characterize the RFP site. No permits are required except those necessary for excavation to obtain site characterization samples and use of dynamite as described below. The activities will be to characterize the OUs so that Remedial Investigation efforts and subsequent Feasibility Studies are conducted. Examples of the activities include: drilling of boreholes and wells, and surface water, ground water, sediments, air, flora, and fauna samples collected for site characterization. Sampling will be conducted continually to take advantage of various growing seasons and developmental stages for flora and fauna samples. Seasonal variations data may also provide a basis for abiotic samples collected.

The samples will be collected by a variety of methods depending on the sample matrix type, but generally, will involve manually collected samples with simple hand-held portable equipment graduating to more complex heavy equipment collection devices, such as drill rigs. Other instrumentation will be used to conduct various surveys (e.g., seismic or geologic characterization, mapping, species distribution, etc.)

Some characterization activities will be focused on individual OUs, while others will be site-wide. The following paragraphs describe first the OU specific characterization programs, followed by the site-wide programs.

OU-SPECIFIC PROGRAMS

Operable Unit No. 1 - 881 Hillside

FIELD INVESTIGATION:

The locations of known sources of potential contamination or Individual Hazardous Substance Sites (IHSS) are identified in Figure 1. The Phase II RCRA Facility Investigation/Remedial Investigation (RFI/RI) field investigation will have these activities performed:

- Drill fifty-four boreholes and sample soils, bedrock materials, and wastes within IHSS. (See Figure 2.)
- Sample surficial soils for radionuclides and subsurface soils for radionuclides, TCL volatiles, semi-volatiles, and pesticides/PCBs, TAL metals, and inorganics. The Soil Sampling Program includes twenty soil stations on 2.5- to-10-acre plots that will be surveyed and sampled with spoon-size samplers.
- Install and sample seventeen ground water monitoring wells. (See Figure 2.)
- Perform aquifer tests, tracer tests, and geotechnical tests. (See Figure 3.)
- Collect surface water samples from ten new surface water stations. (Surface water sampling stations are simply points on stream or ditch banks marked by a stake or similar marker so that sampling is always done at the same point). (See Figure 7 for locations; also see Table 1.)

- Add three new sediment sampling stations. (Sediment sampling stations are simply points on stream or ditch banks marked by a stake or similar marker so that sampling is always done at the same point.) (See Figure 2.)
- Take water level measurements and stream flow measurements.
- Collect data on species distribution and habitat.
- Measure terrestrial vegetation for composition, productivity, and biomass.
- Collect tissue samples to analyze for intake rates, exposure times, and food chain relationships in flora and fauna.
- Measure ecological endpoints of toxicity to assess the differences in populations and communities between impacted and unimpacted reference areas by collecting and analyzing samples of flora and fauna.

SITE CHARACTERIZATION:

Geologic and hydrologic data will be incorporated into existing site maps and cross sections. Geologic data will be used to evaluate in detail the sedimentology and depositional framework of surficial materials and weathered bedrock. Paleochannel trends and potential contamination pathways will be further delineated. Hydrologic data will be used to evaluate seasonal variations in water levels, ground water flow, and the extent of saturated surficial materials. Also evaluated will be hydraulic conductivity, ground water velocity, contaminant migration rates, and the interaction between ground water and surface water. Brief field surveys and an ecological inventory will be conducted to describe the existing ecological setting in terms of habitats, vegetation, wildlife, and aquatic species. Observations for obvious signs or zones of contamination or impacts to biota and their habitats will be made.

SAMPLE LOCATIONS:

Water, soil, flora and/or fauna samples will be collected from within the following SWMUs/IHSSs:

- Oil Sludge Pit Site (IHSS Ref. No. 102)
- Chemical Burial Site (IHSS Ref. No. 103)
- Liquid Dumping Site (IHSS Ref. No. 104)
- Out-of-Service Fuel Oil Tanks (IHSS Ref. Nos. 105.1 and 105.2)
- Outfall Site (IHSS Ref. No. 106)
- Hillside Oil Leak Site (IHSS Ref. No. 107)
- Multiple Solvent Spill Site (IHSS Ref. Nos. 119.1 and 119.2)

- Radioactive Site No. 1-800 Area (IHSS Ref. No. 130)
- Sanitary Waste Line Leak Site (IHSS Ref. No. 145)
- Building 885 Drum Storage Site (IHSS Ref. No. 177)

In addition, samples will be gathered from areas in or near the OU but outside of designated SWMUs/IHSSs.

OPERABLE UNIT NO. 2 - 903 PAD, MOUND, AND EAST TRENCHES AREA

The locations of known sources of potential contamination or Individual Hazardous Substance Sites (IHSS) are identified in Figure 4. Operable Unit No. 2 has been separated into alluvial and bedrock portions to characterize potential contamination east of the Rocky Flats Plant. The aspects are addressed below.

ALLUVIAL:

FIELD INVESTIGATION

Water, soil, flora and/or fauna samples will be collected from within the following SWMUs/IHSSs:

- Drilling and testing boreholes and wells at 122 sites. (Approx 150 ea. boreholes and wells.) (See Figures 5 and 6.)
- Sampling of boreholes and wells.
- Environmental Evaluation (Approx 1000 Acres.) (See Figures 9 and 10.)
- Collect surface water samples (see Figure 8 for locations of sampling stations).
- Collect sediment samples (see Figure 8 for locations of sampling stations).
- Take water level measurements, stream flow measurements, and ground water quality parameters.
- Collect data on species distribution and habitat.
- Measure terrestrial vegetation for composition, productivity, and biomass.
- Collect tissue samples from flora and fauna to analyze for intake rates, exposure times, and food chain relationships.
- Measure ecological endpoints of toxicity to assess the differences in populations and communities between impacted and unimpacted reference areas.

In addition, samples will be gathered from areas in or near the OU but outside of designated SWMUs/IHSSs.

SITE CHARACTERIZATION:

Geologic and hydrologic data will be incorporated into existing site maps and cross sections. Geologic data will be used to detail the stratigraphy of surficial materials and weathered bedrock within source areas and to map the extent of paleochannels in the top of bedrock. Hydrologic data will be used to evaluate seasonal variations in water levels, ground water flow, and the extent of saturated surficial materials. Also evaluated will be storage capability, ground water velocity, contaminant migration rates, and the interaction between ground water and surface water.

SAMPLE LOCATIONS:

Water, soil, flora and/or fauna samples will be collected from within the following SWMUs/IHSSs:

- 903 Drum Storage Site and 903 Pad Lip Site (IHSS Ref. NO. 112 and 155)
- Trench T-2 Site and Reactive Metal Destruction Site (IHSS Ref. Nos. 109 and 140)
- Mound, Oil Burn Pit, and Trench T-1 Sites (IHSS Ref. Nos. 113, 153, and 108)
- Pallet Burn Site (IHSS Ref. No. 154)
- Trenches T-3, T-4, T-10, and T-11 (IHSS Ref. Nos. 110, 111.1, 111.7, and 111.8)
- Trenches T-5 through T-9 (IHSS Ref. Nos. 111.2 through 111.6)
- East Spray Field (IHSS Ref. Nos. 216.2 and 216.3)
- Gas Detoxification Site (IHSS Ref. No 183)

In addition, samples will be gathered from areas in or near the OU but outside of designated SWMUs/IHSSs.

BEDROCK

FIELD INVESTIGATION:

- Approximately twenty boreholes and thirty-eight wells. (See Figure 6.)
- Additional sampling based on outcome of interim results.

OPERABLE UNIT NO. 5 - WOMAN CREEK DRAINAGE

FIELD ACTIVITIES:

The field sampling plan for each IHSS consists of a combination of screening activities, sampling of soils, sediment, air, and surface water, well installation and sampling; the sampling plan is briefly summarized below.

- IHSS 115 - Original Landfill (see Figures 11 and 12). Screening activities at the Original Landfill will consist of a review of the gamma radiation survey recently completed and completion of a soil gas survey. Sampling will include subsurface sampling in borings and sediment and surface water sampling adjacent to the unit. Wells will be installed and sampled downgradient of the unit and in selected soil borings if a plume is encountered. An additional activity at the unit will be a study of the pipes protruding from the landfill and sampling of effluent from the pipes, if present.

- IHSS 133.1-6 - Ash Pits 1-4, Incinerator, and Concrete Wash Pad. (See Figure 13.) A radiological survey will be the screening activity conducted at the IHSS 133 sites. Surface soil samples will be collected from the locations that have high radiation concentrations identified during the radiological survey. Subsurface soil samples will also be collected from borings in the Ash Pit areas. Three monitoring wells will be installed downgradient of the units and sampled.

- IHSS 142 - Detention Ponds - C-Series. (See Figure 14.) Surface water samples will be collected from several locations in each pond. Sediment samples will be collected in the ponds, as well as along the entire Woman Creek drainage within the Rocky Flats Plant. Sediment samples will also be collected in the South Interceptor Ditch (SID). Background surface water and sediment samples will be collected west of the Plant. Two monitoring wells will be installed and sampled in the alluvium downgradient of each dam at Ponds C-1 and C-2.

- IHSS 209 - Surface Disturbance Southeast of Building 881 and Surface Disturbances South of the Ash Pits. (See Figure 14.) Visual inspections of the surface disturbance areas and review of historical use information pertaining to these sites will be completed prior to screening and sampling activities. A radiological survey will be completed at each area. Surface soil samples will be collected from the three pits at IHSS 209 and from the ditch at the surface disturbance south of the Ash Pits. A sediment sample and water sample (if water is present) will be collected from each of the former pond areas at IHSS 209. Surface and subsurface soil samples will be collected from borings in each of the trenches and the fill areas at the surface disturbance south of the Ash Pits.

- Semi-permanent air monitoring stations will be installed and operated at the locations shown in Figure 24. Monitors will be mounted on existing posts when possible. When necessary, new posts will be installed to support the monitors.

OPERABLE UNIT NO. 6 - SOUTH WALNUT CREEK DRAINAGE

FIELD ACTIVITIES:

The field work projected for each IHSS requires a combination of screening activities, sampling of soils, sediment, air, and surface water, and well installation and sampling. The activities are briefly summarized below.

- IHSS 141 - Sludge Dispersal Area. (See Figure 15.) The screening activity at the sludge dispersal area will be a radiological survey. Sampling activities will be limited to surface soil sampling. One monitoring well will be installed downgradient of the unit and sampled.

- IHSS 142.1-9, 12 - Detention Ponds - A-Series and B-Series. (See Figures 16, 17, 18a, and 18b.) Surface water and sediment samples will be collected in several locations in each pond. Sediment samples will also be collected from Walnut Creek upgradient and downgradient of the ponds and between the ponds. Background surface water and sediment samples will be

collected north and west of the Plant. A total of four monitoring wells will be installed and sampled in the alluvium downgradient of the dams at Ponds A-4 and B-5.

- IHSS 143 - Old Outfall. (See Figure 19.) The screening activity at the Old Outfall site will be a radiological survey. Sampling will include surface soil sample collection at the existing surface and at the original surface below the fill, collection of soil samples to a depth of two feet below the original ground surface, and collection of composite fill samples. In addition, soil samples will be collected upslope from the Old Outfall where the surface runoff was channeled to this area.

- IHSS 156.2 - Soil Dumping Area (See Figure 15.) One monitoring well will be installed as shown in Figure 15. Fourteen soil sampling boreholes will be drilled up to approximately 15 feet deep at the locations shown in the same Figure.

- IHSS 165 - Triangle Area. (See Figure 15.) A radiological survey and a soil gas survey will be the screening activities conducted at the Triangle Area. Surface soil samples will be collected from plume areas delineated during the screening. Subsurface samples will be collected from the same locations as the surface samples. Two alluvial ground water monitoring wells will be installed within the IHSS and sampled.

- IHSS 166.1-3 - Trenches A, B, and C. (See Figure 20.) The screening activity will consist of an electromagnetic geophysical survey which will be used to delineate the locations and extent of the trenches as well as seismic geologic characterization. Subsurface samples will be collected from borings drilled along the long axis of the trenches. One ground water well will be installed east of this IHSS and sampled.

- IHSS 167.1-3 - North Area, Pond Area, and South Area Spray Fields. (See Figure 20.) Based on the findings of the aerial photograph review, surface and subsurface soil samples will be collected in each spray field area using a grid location system. Two alluvial ground water monitoring wells will be installed and sampled, one downgradient of the North Area Spray Field and one downgradient of the South Area Spray Field. There will also be seismic geologic characterization conducted by trucks equipped with vibratory equipment.

- IHSS 216.1 - East Area Spray Field. (See Figure 17.) Although the Interagency Agreement (IAG) does not specify field sampling at this site, limited surface and subsurface soil samples will be collected within this unit.

- Two air monitoring stations will be installed and operated at the locations shown in Figure 25.

SITE-WIDE PROGRAMS

Geologic Characterization Program

The on-going site-wide geologic characterization program will result in the drilling in approximately 63 boreholes. Of those, 11 will be in or immediately adjacent to SWMUs. The remainder will be located in different areas of the buffer zone as shown in Figure 21.

A second part of the geologic characterization program consists of a deep seismic line to be shot, partially across the north side of Rocky Flats and also to the beginning of the foothills to the west and approximately one (1) mile east of RFP adjacent to the north side of Great Western Reservoir. This will be

shot as one continuous line, the location of which is shown in Figure 26. The seismic line is to be shot at locations offsite of RFP and will be done by blasting with dynamite. The dynamite will be of relatively low charge, similar to that of a blasting cap. No significant noise is expected to be created. While on RFP, trucks equipped with vibratory equipment will be used. Permission from the respective landowners and proper permitting for the use of dynamite is currently being sought.

Well Abandonment and Replacement Program

As part of the overall site characterization program at RFP, and in response to a tiger team finding, all pre-1989 monitoring wells are to be abandoned because of uncertainties about their construction. The total number of wells to be abandoned is approximately 60. Locations of these wells are shown in Figure 22. Abandonment will consist of pulling the well casing, plugging the well with bentonite and capping it with concrete. Of the 60 wells being abandoned, approximately 30 are to be replaced with new wells. The 30 have not yet been identified, but each of the replacement wells will be drilled in the vicinity of one of the wells to be abandoned.

Wind-Site Investigation Program

Three wells will be drilled at the Wind-Site in locations shown in Figure 23. The wells will be drilled to characterize possible petroleum contaminants in the area.

COSTS

The total estimated cost to conduct this characterization effort will be approximately two million dollars.

SCHEDULE/PROJECT JUSTIFICATION

The sampling activities to be conducted are in response to milestones in the Interagency Agreement (IAG). The due dates vary for each Operable Unit, but since sampling activities are scheduled to begin by the end of May 1991, this date is the impetus for action.

EMISSION QUANTITIES

Because of operational procedures already in place, very limited amounts, if any, of disturbed sample matrix will cause a fugitive emissions problem. The samples gathered for analyses purposes will be contained and controlled under the chain of custody procedures implemented. Sample size may range from several pounds of dirt to several gallons of water.

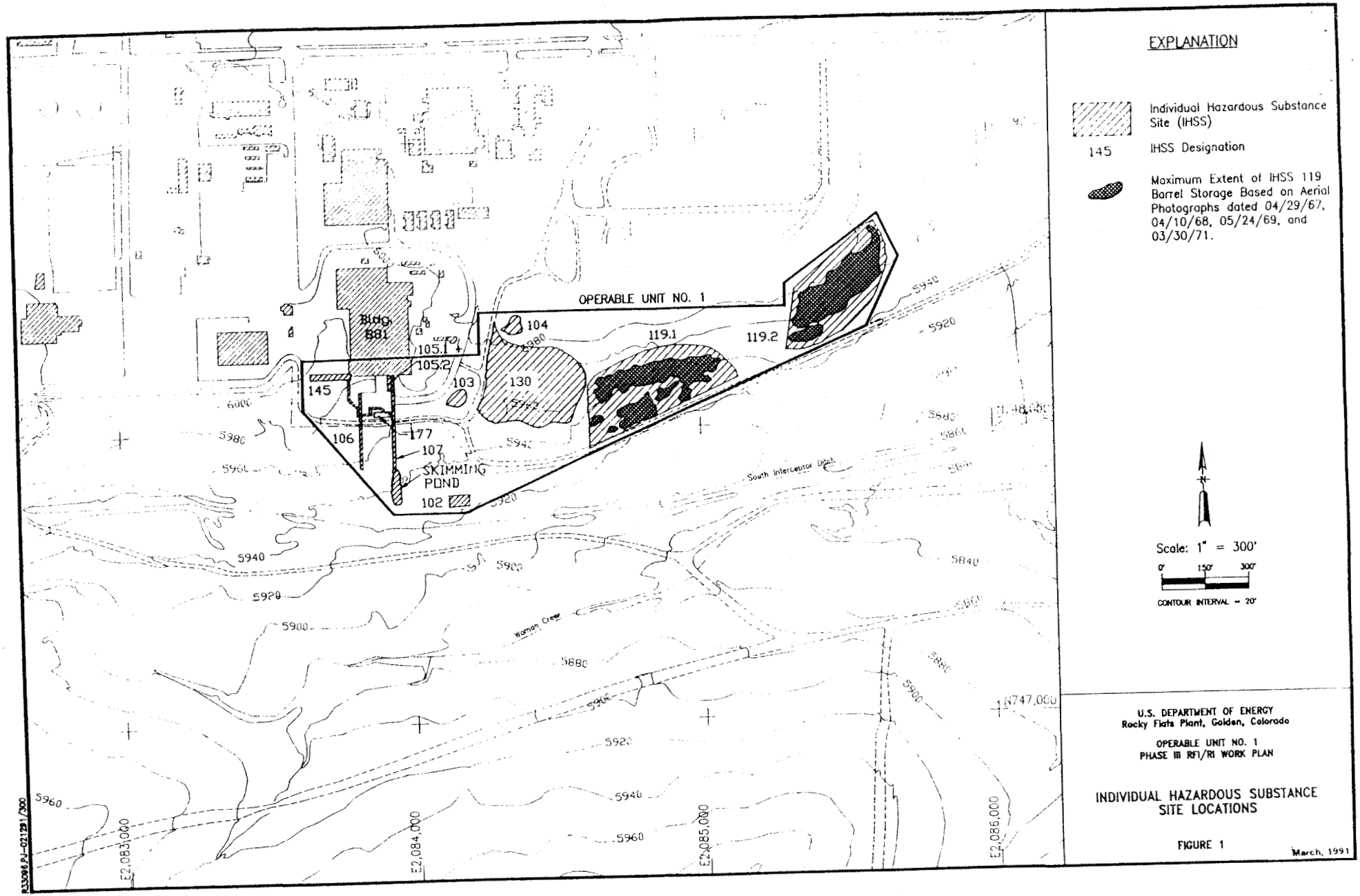
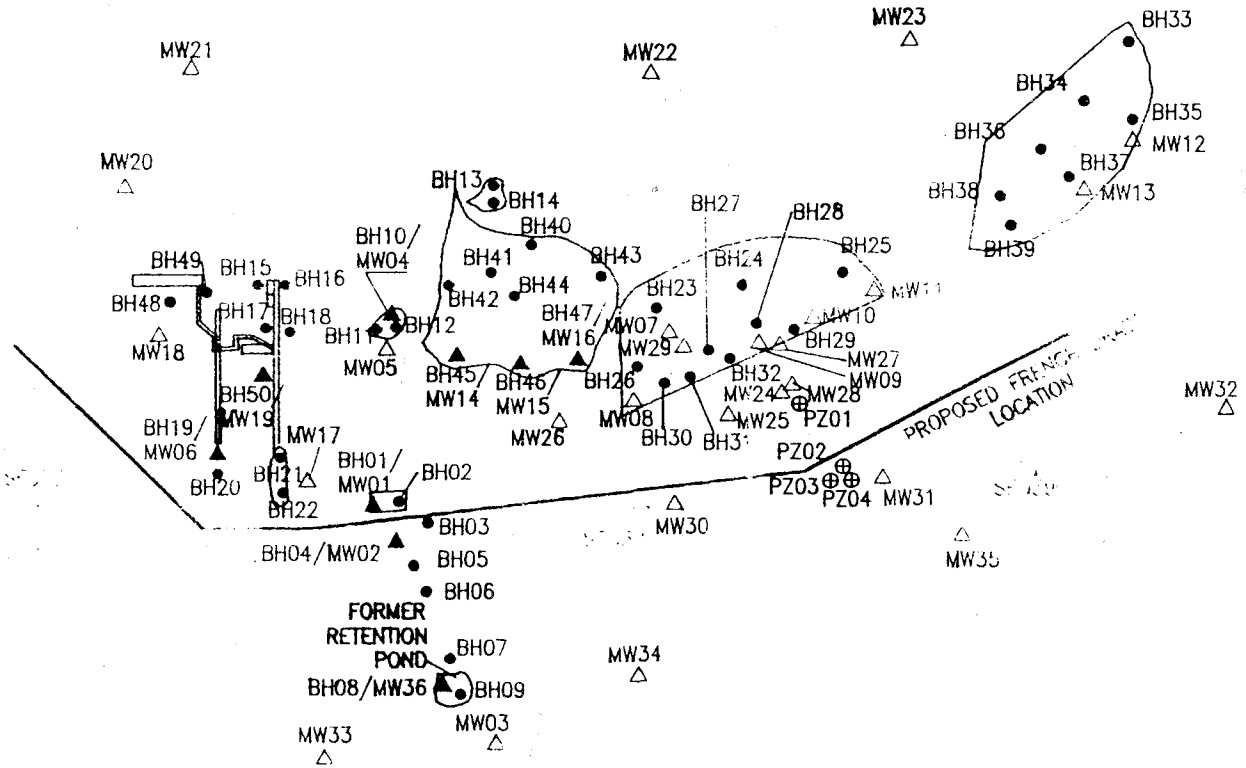

EXPLANATION
Individual Hazardous Substance Site (IHSS)
145
IHSS Designation
Maximum Extent of IHSS 119 Barrel Storage Based on Aerial Photographs dated 04/29/67, 04/10/68, 05/24/69, and 03/30/71.
OPERABLE UNIT NO. 1
Bldg. 881
104
105.1
105.2
103
130
119.1
119.2
145
106
177
107
SKIMMING POND
102
South Interceptor Ditch
Woman Creek
5940
5920
5900
5880
5960
5980
6000
5860
5840
N747,000
E2,083,000
E2,084,000
E2,085,000
E2,086,000
Scale: 1" = 300'
0'
150'
300'
CONTOUR INTERVAL = 20'
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado
OPERABLE UNIT NO. 1
PHASE III RFI/RI WORK PLAN
INDIVIDUAL HAZARDOUS SUBSTANCE SITE LOCATIONS
FIGURE 1
March, 1991
R33096.PJ-022191/300

FIGURE 1



EXPLANATION

Individual Hazardous Substance Site (IHSS)

Proposed French Drain Location

MW01 Proposed Monitor Well

BH01 Proposed Borehole

BH01/MW01 Proposed Borehole and Monitor Well

PZ01 Proposed Piezometer

Proposed Sediment Stations

N

Scale: 1" = 300'

0' 150' 300'

CONTOUR INTERVAL = 20'

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

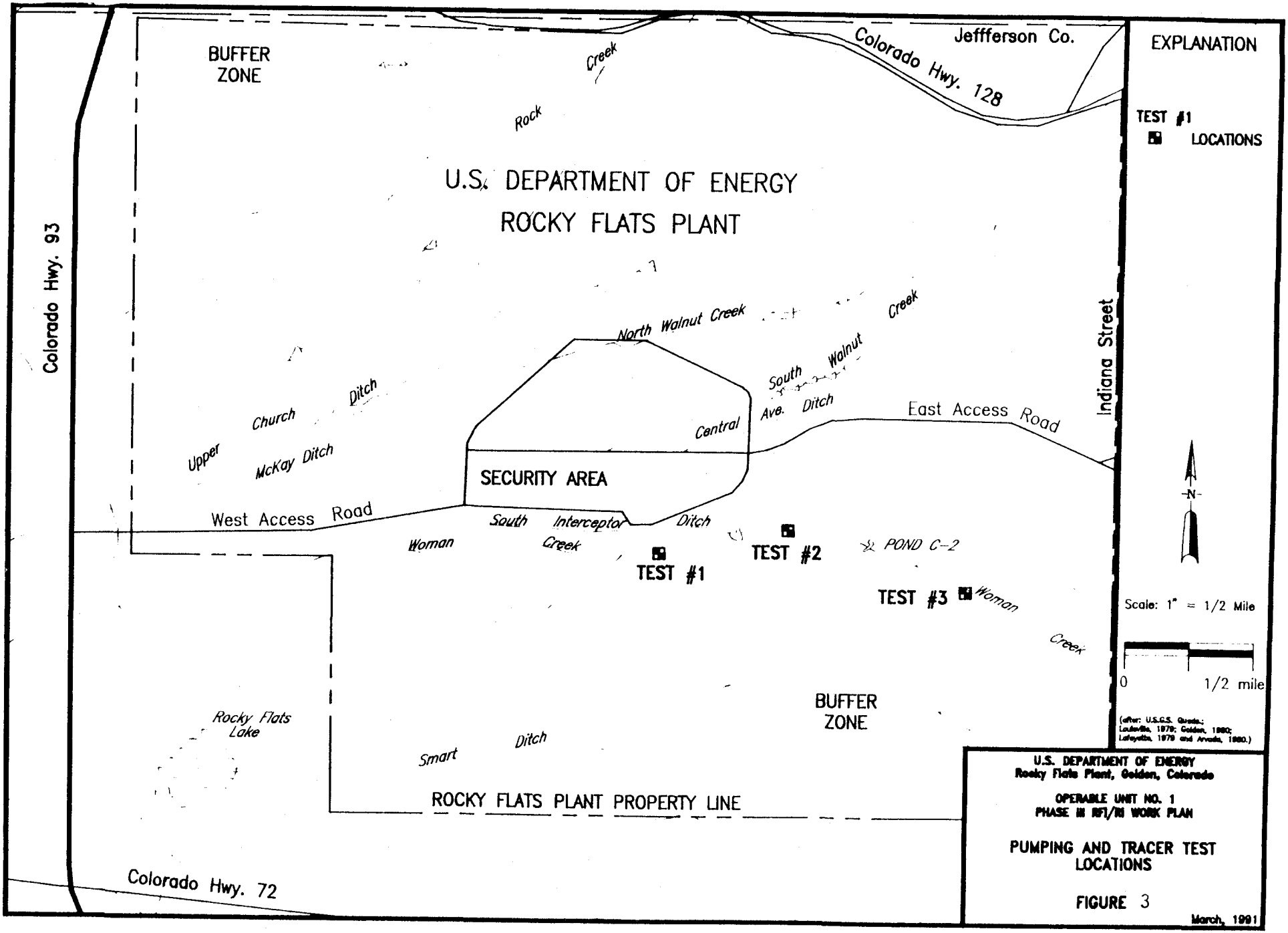
OPERABLE UNIT NO.1
PHASE III RFI/RI WORK PLAN

FIGURE

PROPOSED PHASE III RFI/RI MONITOR WELL, BOREHOLE, PIEZOMETER, AND SEDIMENT STATION LOCATIONS

October, 1990

FIGURE 2


BUFFER ZONE
Rock Creek
Colorado Hwy. 128
Jeffferson Co.
EXPLANATION
TEST #1 LOCATIONS
U.S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
Colorado Hwy. 93
North Walnut Creek
South Walnut Creek
Indiana Street
Upper Church Ditch
McKay Ditch
Central Ave. Ditch
East Access Road
SECURITY AREA
West Access Road
South Interceptor Ditch
Woman Creek
TEST #1
TEST #2
POND C-2
TEST #3
Woman Creek
Scale: 1" = 1/2 Mile
0
1/2 mile
BUFFER ZONE
Rocky Flats Lake
Smart Ditch
ROCKY FLATS PLANT PROPERTY LINE
Colorado Hwy. 72
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado
OPERABLE UNIT NO. 1
PHASE III RFI/RI WORK PLAN
PUMPING AND TRACER TEST LOCATIONS
FIGURE 3
March, 1991

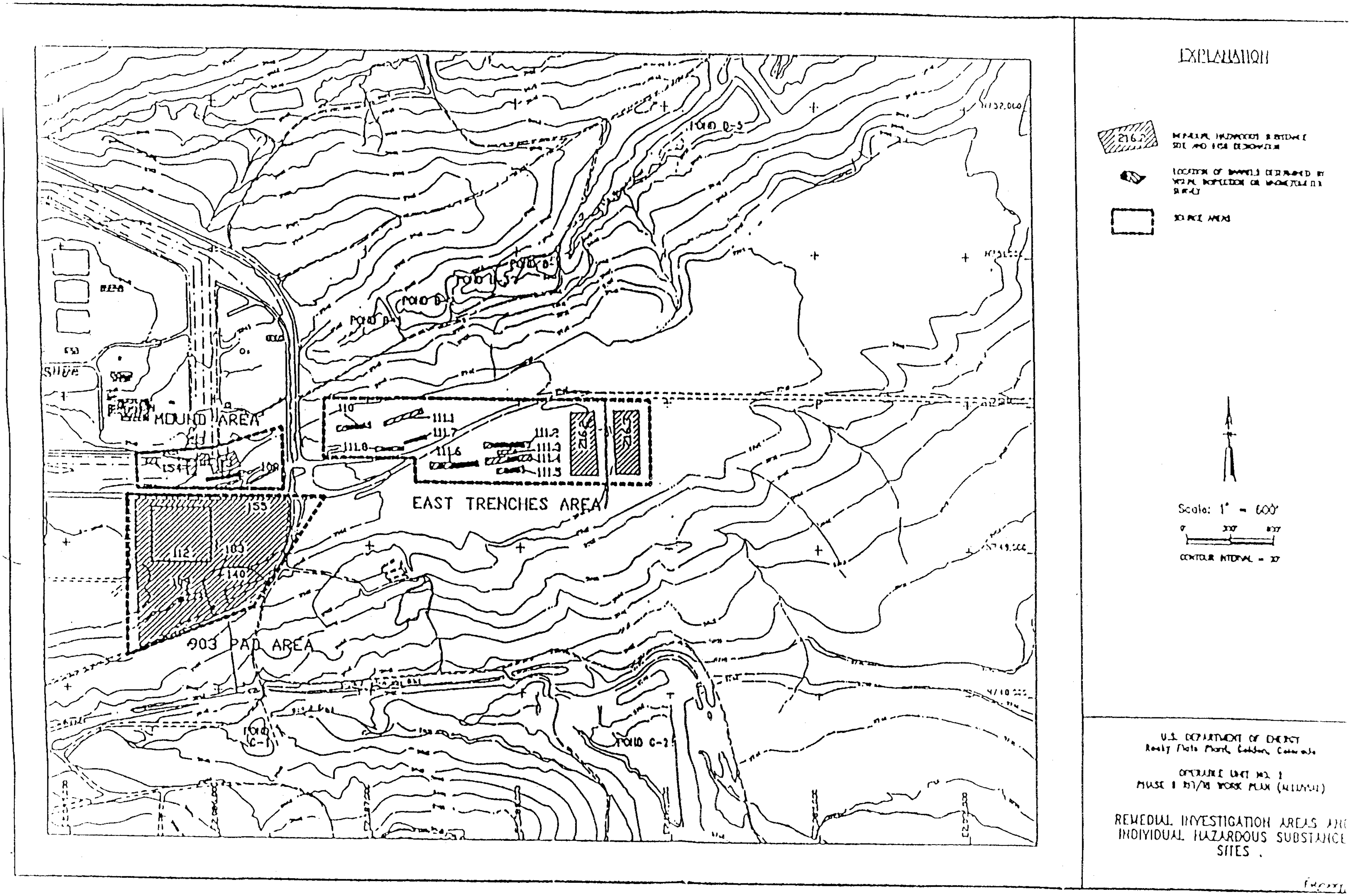
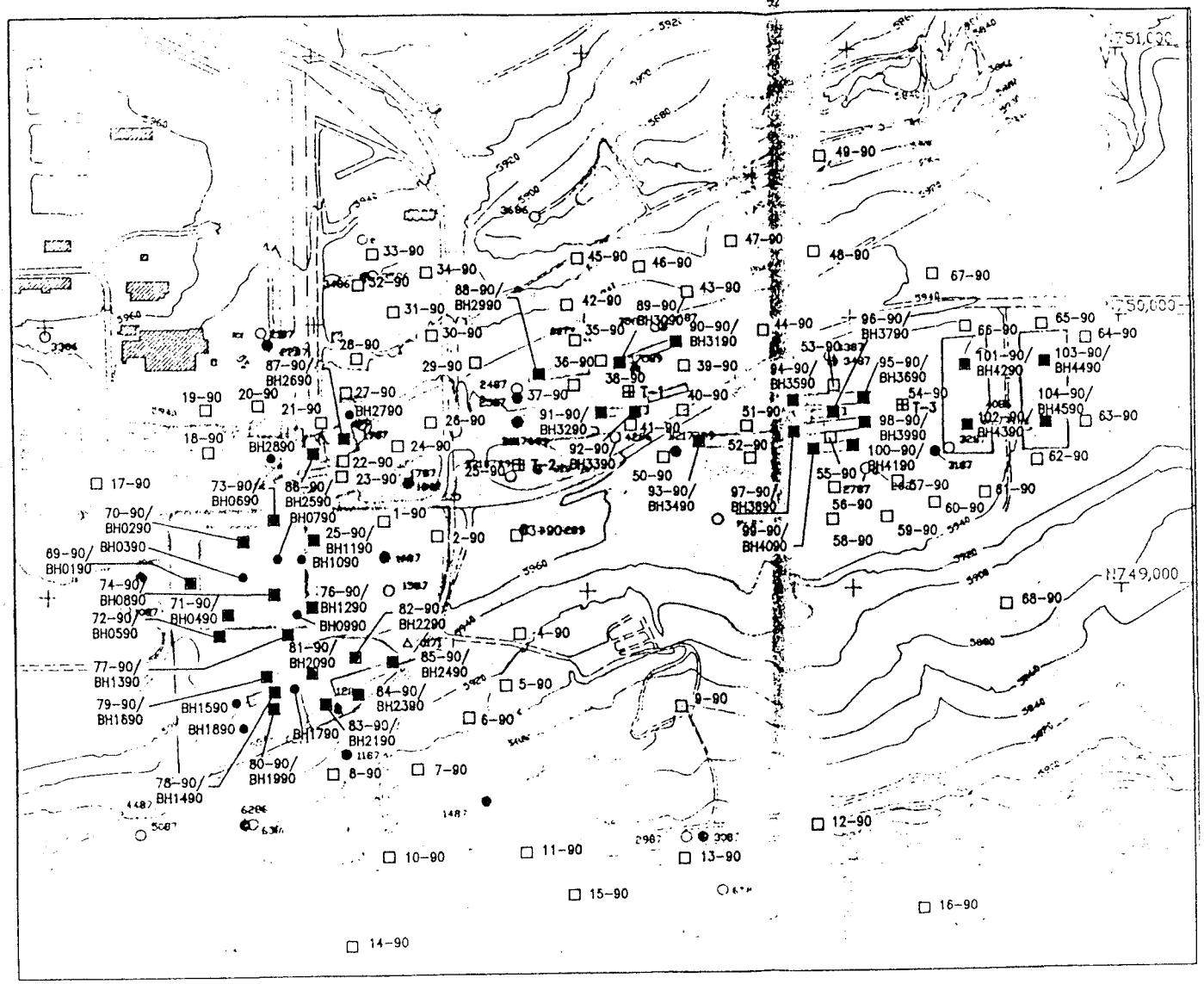

EXPLANATION
SOURCE AREAS
Scale: 1" = 600'
MOUND AREA
EAST TRENCHES AREA
903 PAD AREA
POND D-5
POND C-2
110
111.1
111.7
111.8
111.6
111.2
111.3
111.4
111.5
216.2
216.3
155
112
140
108
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado
OPERABLE UNIT NO. 2
REMEDIAL INVESTIGATION AREAS AND
INDIVIDUAL HAZARDOUS SUBSTANCE
SITES .

FIGURE 4



NOTE:

- Additional borehole/wells in eastern part of OU-2.
- Numbers changed from 90 to 91 to reflect current year 1991.

□ 77-90	PROPOSED PLUME CHARACTERIZATION ALLUVIAL MONITOR WELL
● BH1590	PROPOSED SOURCE CHARACTERIZATION BOREHOLE
■ 18-90/ BH2990	PROPOSED SOURCE CHARACTERIZATION ALLUVIAL MONITOR WELL AND BOREHOLE
+ T-1	PROPOSED HYDRAULIC TEST LOCATION

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

OPERABLE UNIT NO. 2
RI/FS WORK PLAN

FIGURE 5

PHASE II REMEDIAL INVESTIGATION
PROPOSED MONITOR WELL AND
BOREHOLE LOCATIONS

April 1990

RFCORE PJ-040990

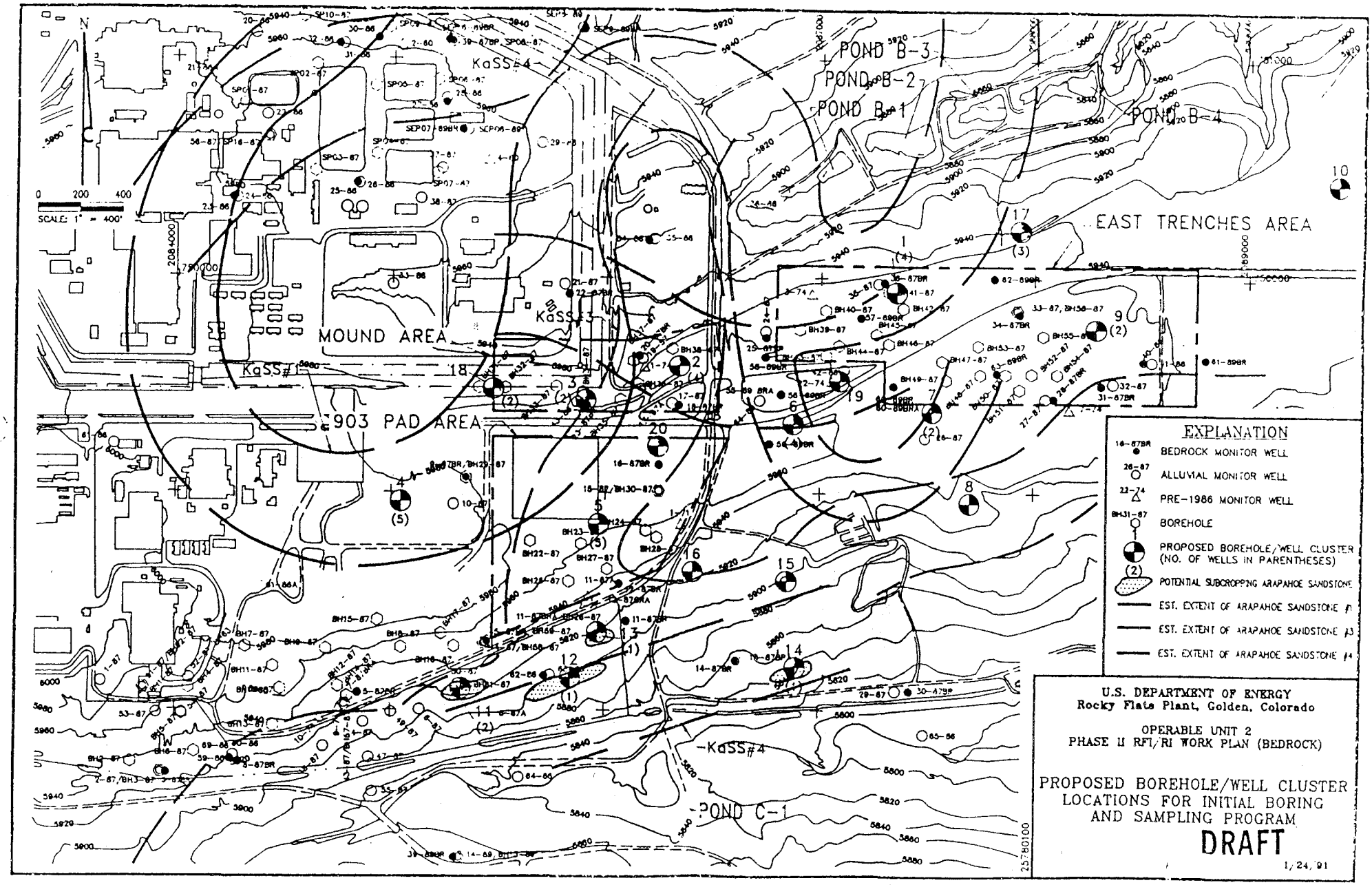

POND B-3
POND B-2
POND B-1
POND B-4
EAST TRENCHES AREA
MOUND AREA
903 PAD AREA
KaSS#1
KaSS#3
KaSS#4
POND C-1
SCALE: 1" = 400'
0 200 400
EXPLANATION
BEDROCK MONITOR WELL
ALLUVIAL MONITOR WELL
PRE-1986 MONITOR WELL
BOREHOLE
PROPOSED BOREHOLE/WELL CLUSTER (NO. OF WELLS IN PARENTHESES)
POTENTIAL SUBCROPPING ARAPAHOE SANDSTONE
EST. EXTENT OF ARAPAHOE SANDSTONE #1
EST. EXTENT OF ARAPAHOE SANDSTONE #3
EST. EXTENT OF ARAPAHOE SANDSTONE #4
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado
OPERABLE UNIT 2
PHASE II RFI/RI WORK PLAN (BEDROCK)
PROPOSED BOREHOLE/WELL CLUSTER LOCATIONS FOR INITIAL BORING AND SAMPLING PROGRAM
DRAFT
1/24/91

FIGURE 6

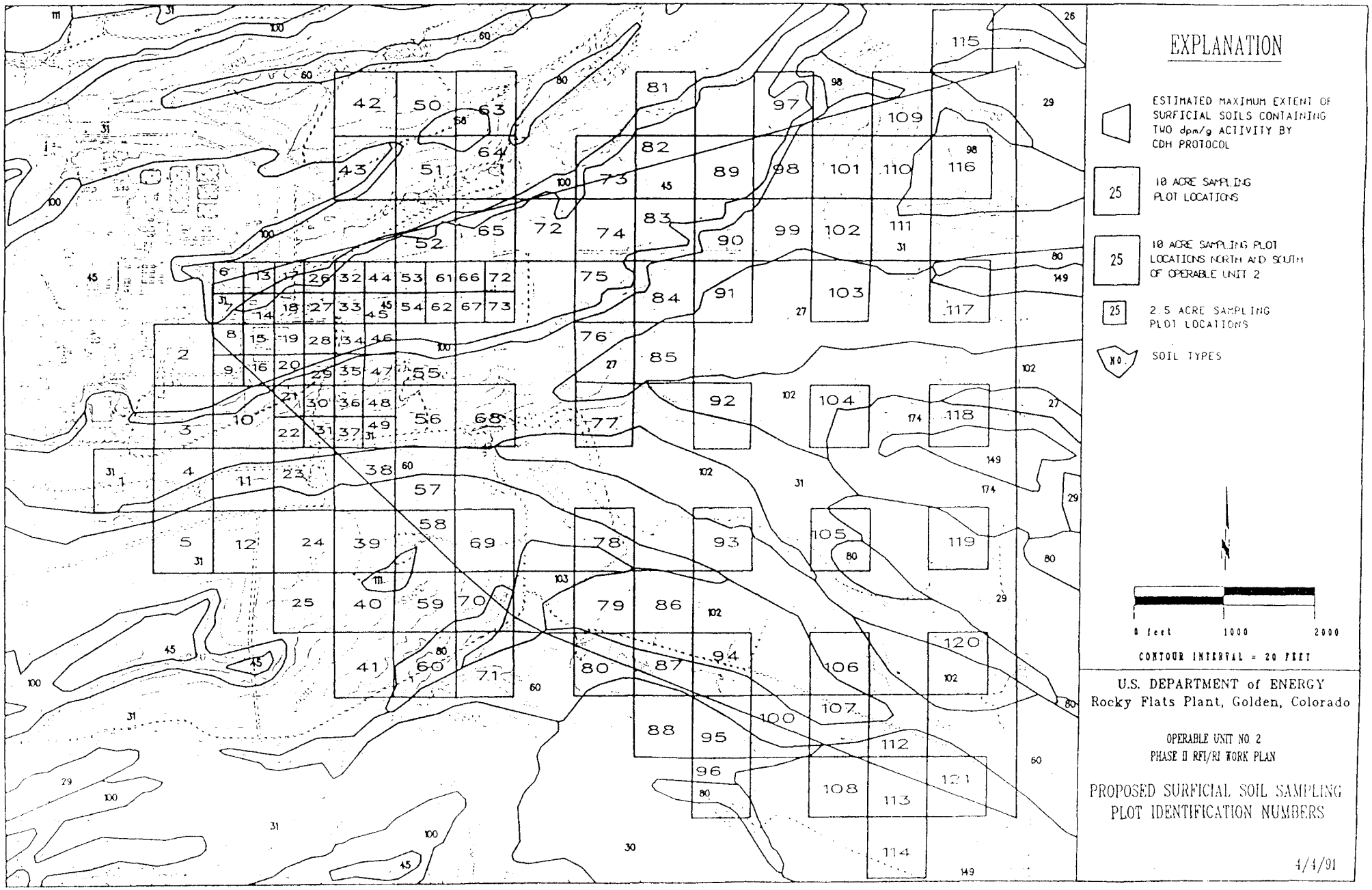

EXPLANATION
ESTIMATED MAXIMUM EXTENT OF SURFICIAL SOILS CONTAINING TWO dpm/g ACTIVITY BY CDH PROTOCOL
25
10 ACRE SAMPLING PLOT LOCATIONS
25
10 ACRE SAMPLING PLOT LOCATIONS NORTH AND SOUTH OF OPERABLE UNIT 2
25
2.5 ACRE SAMPLING PLOT LOCATIONS
NO.
SOIL TYPES
0 feet
1000
2000
CONTOUR INTERVAL = 20 FEET
U.S. DEPARTMENT of ENERGY
Rocky Flats Plant, Golden, Colorado
OPERABLE UNIT NO. 2
PHASE II RFI/RI WORK PLAN
PROPOSED SURFICIAL SOIL SAMPLING PLOT IDENTIFICATION NUMBERS
4/4/91

FIGURE 7

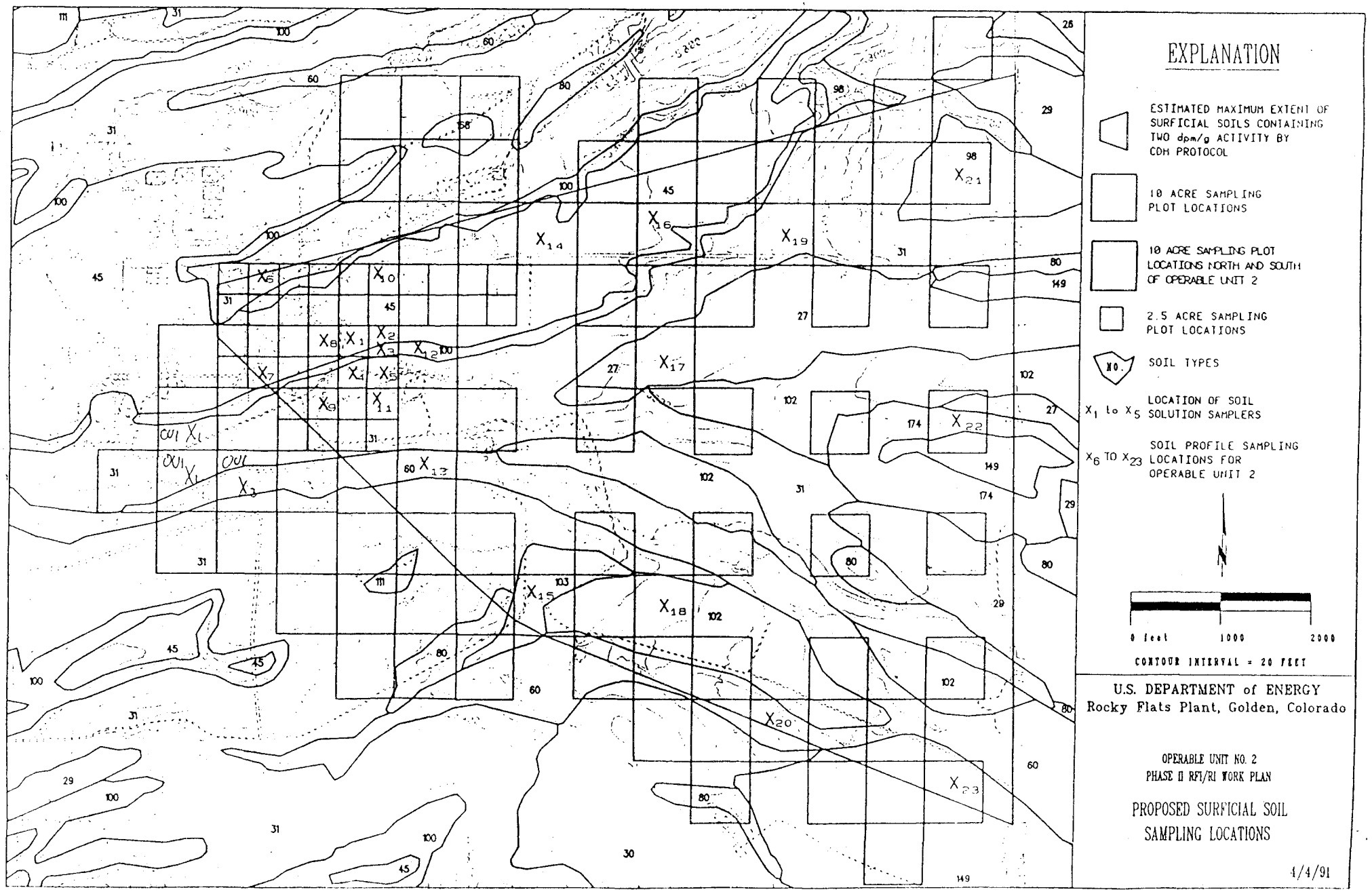
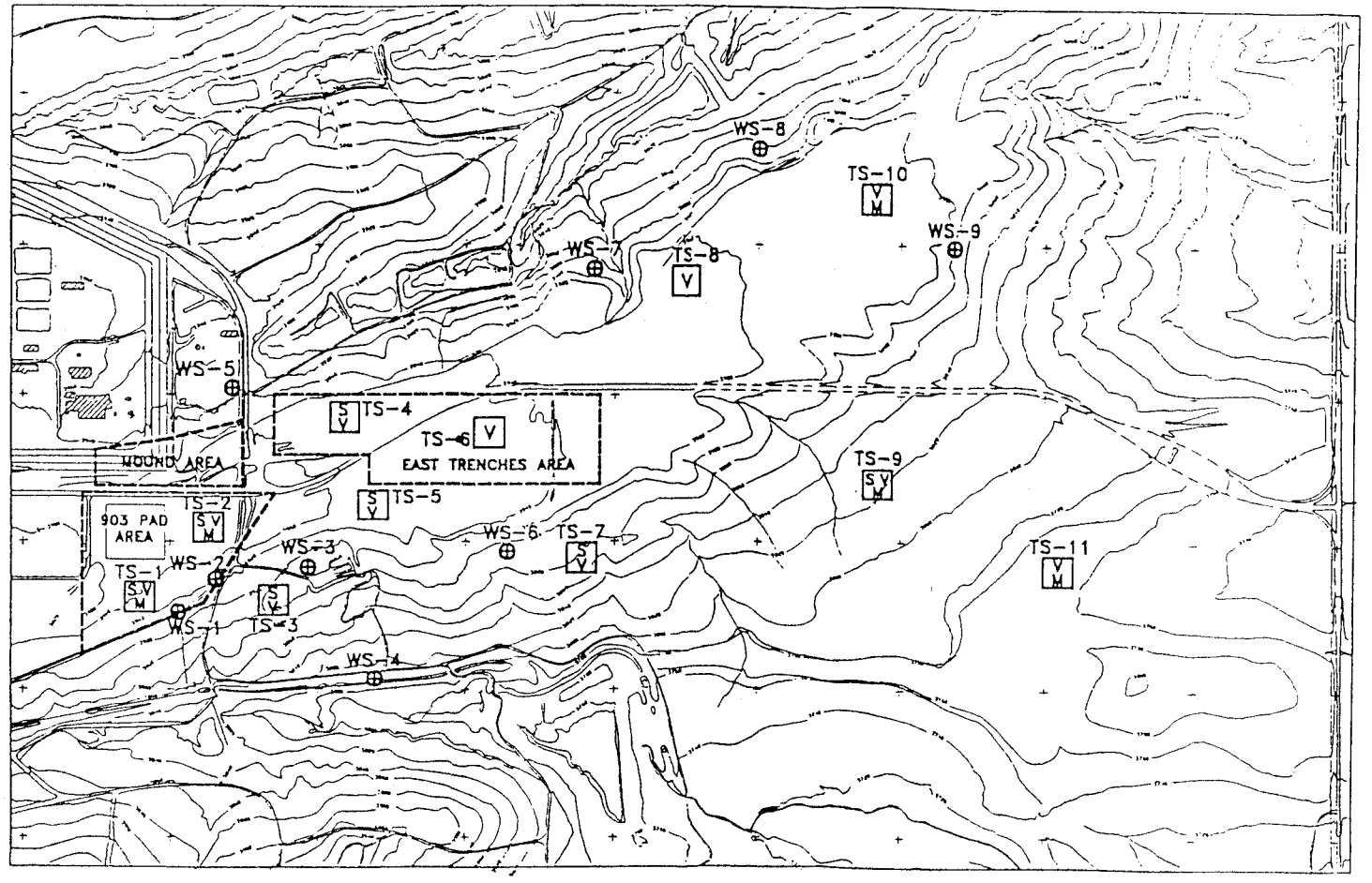

EXPLANATION
ESTIMATED MAXIMUM EXTENT OF SURFICIAL SOILS CONTAINING TWO dpm/g ACTIVITY BY CDH PROTOCOL
10 ACRE SAMPLING PLOT LOCATIONS
10 ACRE SAMPLING PLOT LOCATIONS NORTH AND SOUTH OF OPERABLE UNIT 2
2.5 ACRE SAMPLING PLOT LOCATIONS
NO.
SOIL TYPES
X1 to X5
LOCATION OF SOIL SOLUTION SAMPLERS
X6 TO X23
SOIL PROFILE SAMPLING LOCATIONS FOR OPERABLE UNIT 2
N
0 feet
1000
2000
CONTOUR INTERVAL = 20 FEET
U.S. DEPARTMENT of ENERGY
Rocky Flats Plant, Golden, Colorado
OPERABLE UNIT NO. 2
PHASE II RFI/RI WORK PLAN
PROPOSED SURFICIAL SOIL SAMPLING LOCATIONS
4/4/91

FIGURE 8



EXPLANATION

SOURCE AREAS

TS-1
TERRESTIAL SAMPLING LOCATION

V – GRASSLAND VEGETATION PLOTS
M – SMALL MAMMAL TRAPPING STATION
S – SOIL ROOT SAMPLING LOCATION

WS-7
WETLAND SAMPLING LOCATION

N

Scale: 1" = 800'

0' 400' 800'

CONTOUR INTERVAL = 20'

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

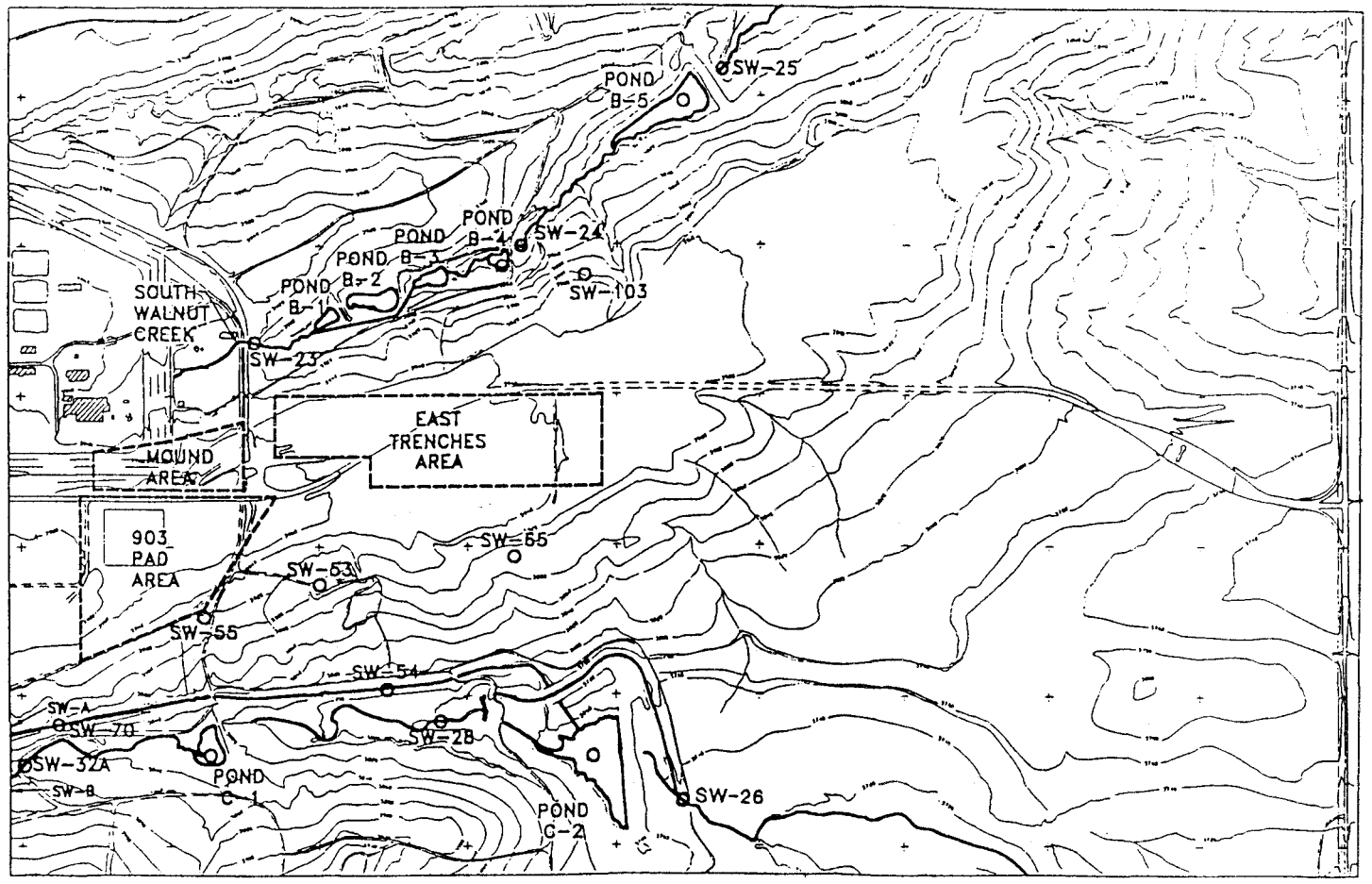
OPERABLE UNIT NO. 2
PHASE II RFI/RI WORK PLAN (ALLUVIAL)

TERRESTRIAL AND WETLAND SAMPLING STATIONS

February, 1991

P33069 PJ-021291

FIGURE 9



EXPLANATION

SOURCE AREAS

SW-1 SAMPLING STATION

N

Scale: 1" = 800'

0' 400' 800'

CONTOUR INTERVAL = 20'

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

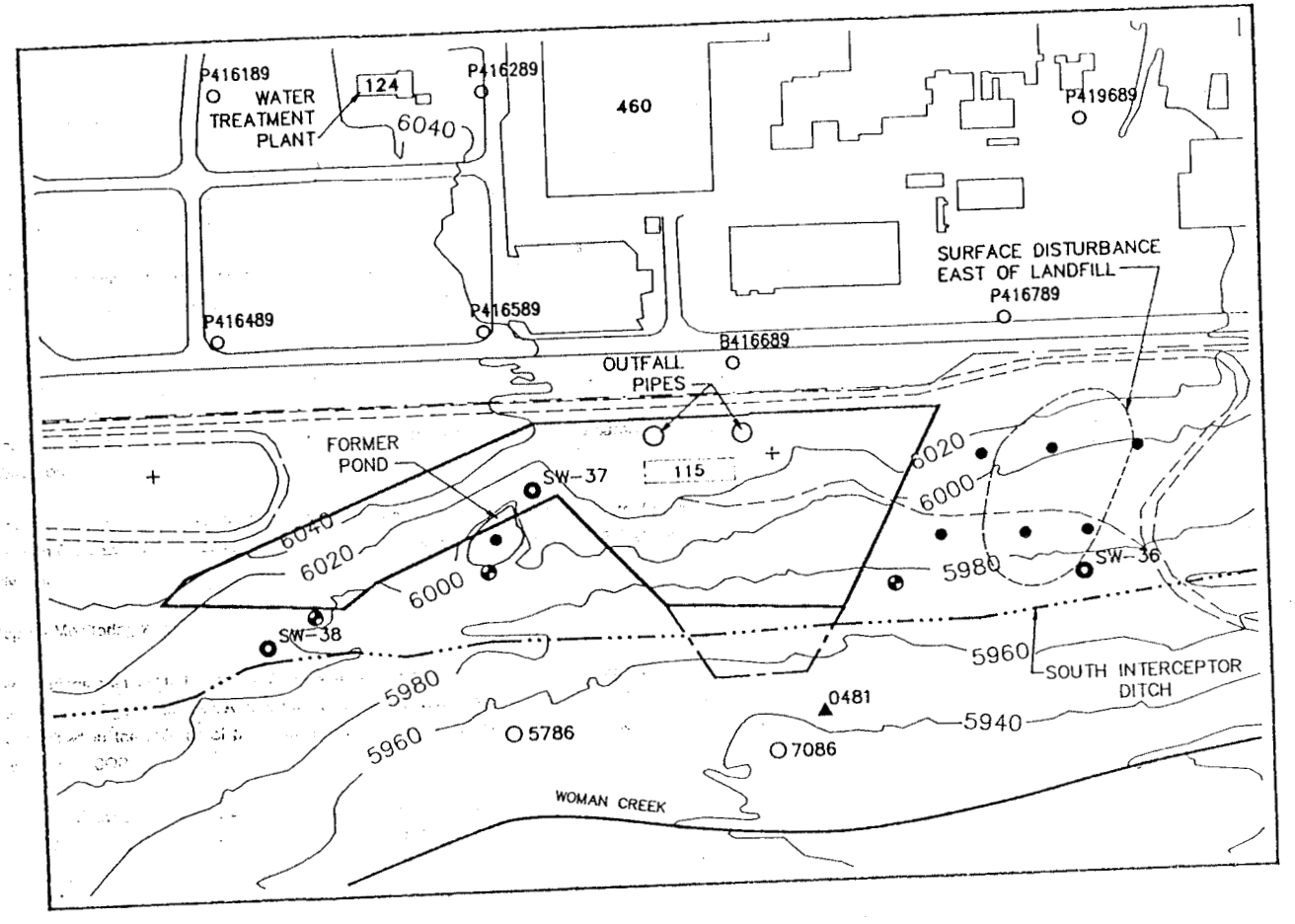
OPERABLE UNIT NO. 2
PHASE II RFI/RI WORK PLAN (ALLUVIAL)

AQUATIC ECOLOGY
SAMPLING STATIONS

February, 1991

RJ3068.PJ-021291

FIGURE 10



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FOR COMMENTS AND DISCUSSION ONLY

N

0 100 200
SCALE: 1" = 200'

EXPLANATION

- 115 — INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- SW-1 — SURFACE WATER SAMPLING LOCATION
- 5786 — ALLUVIAL GROUNDWATER MONITORING WELL
- 0481 — PRE-1986 MONITORING WELL
- SOUTH INTERCEPTOR DITCH
- DIRT ROAD
- 124 — ROCKY FLATS BLDG. NO.
- PRELIMINARY EXTENSION OF THE LANDFILL BASED ON A SITE RECONNAISSANCE
- PROPOSED WELL LOCATION*
- PROPOSED SOIL BORING LOCATION*

*ALL PROPOSED LOCATIONS ARE APPROXIMATE

FOR SEDIMENT AND SURFACE WATER LOCATIONS, SEE FIGURE 7-4

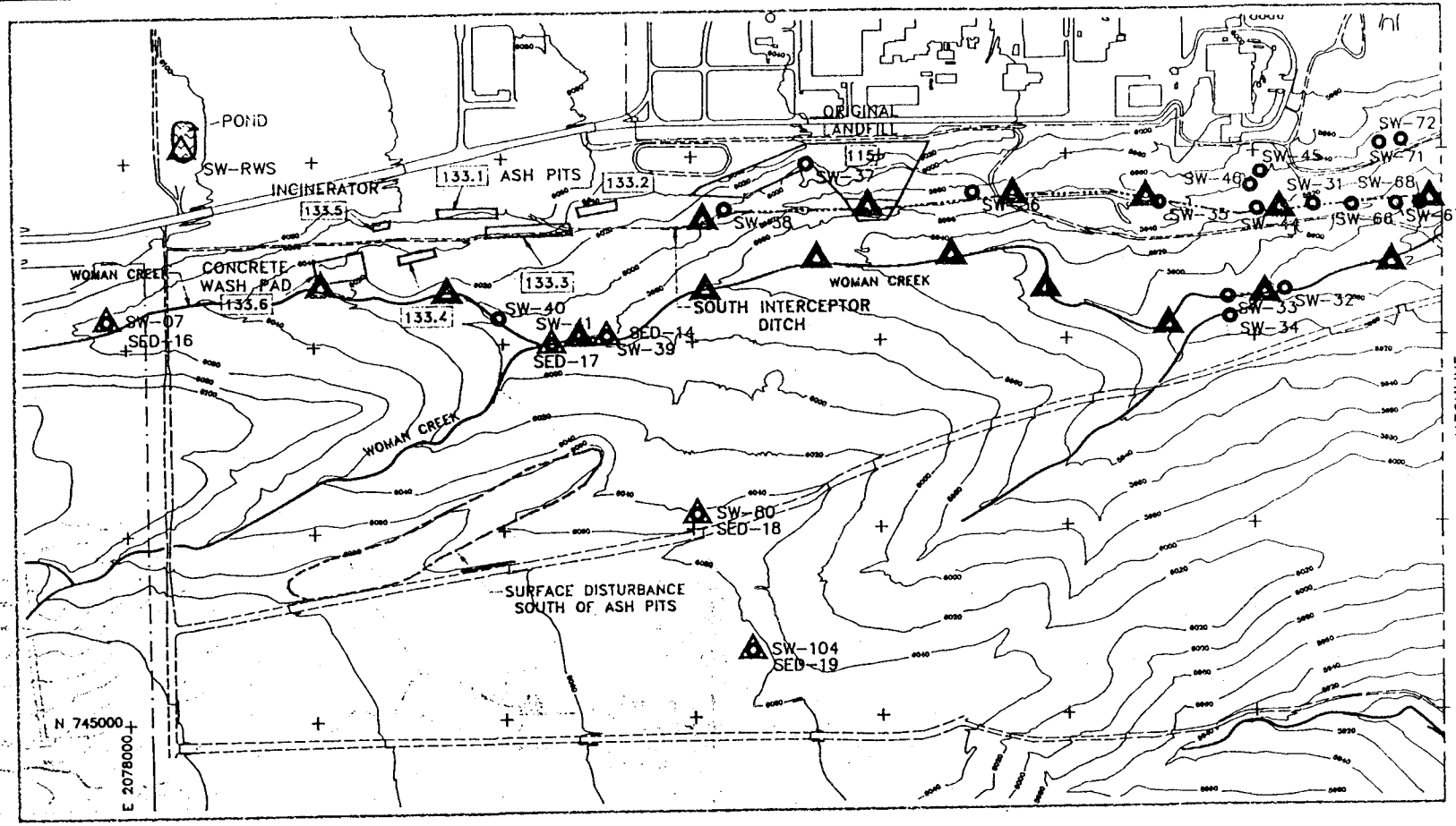
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 5
PHASE I RFI/RI WORK PLAN

PROPOSED SAMPLING AND WELL LOCATIONS IHSS 115 ORIGINAL LANDFILL

FIGURE 11 MARCH 1991

25060090



EXPLANATION

- 115 — INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- SW-1 — EXISTING SURFACE WATER LOCATION
- SED-1 — EXISTING SEDIMENT SAMPLING LOCATION
- SOUTH INTERCEPTOR DITCH
- DIRT ROAD
- PRELIMINARY EXTENSION OF THE SURFACE DISTURBANCE BASED ON A RECONNAISSANCE
- PROPOSED LOCATIONS FOR SEDIMENT SAMPLES

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

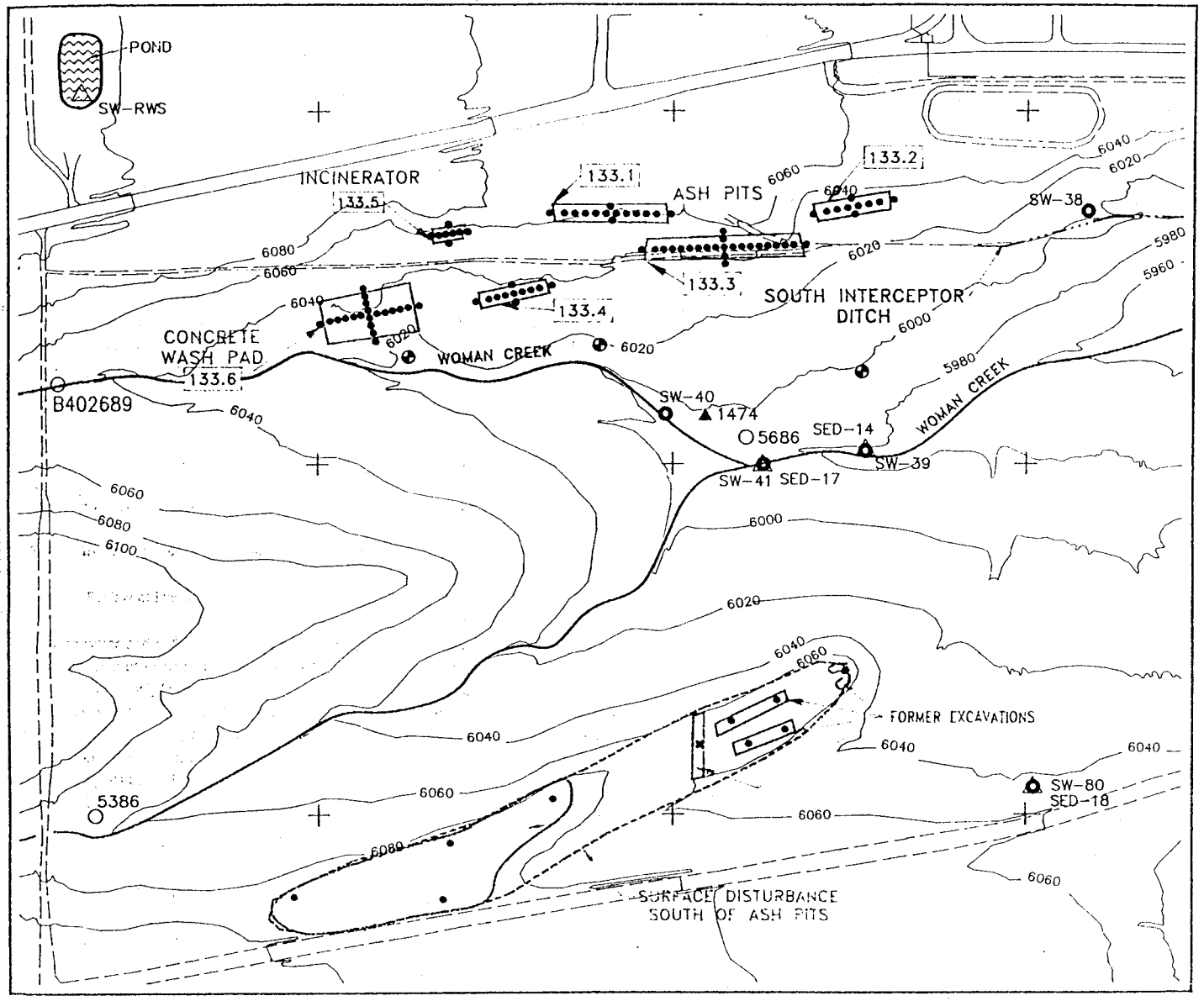
OPERABLE UNIT 5
PHASE I RFI/RI WORK PLAN

SEDIMENT SAMPLING SITES
WOMAN CREEK AND THE SOUTH INTERCEPTOR DITCH

FIGURE 12

MARCH 1991

2506010A



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N

0 150 300

SCALE: 1" = 300'

EXPLANATION

- INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- SW-1 — EXISTING SURFACE WATER SAMPLING LOCATION
- 5786 — EXISTING ALLUVIAL GROUNDWATER MONITORING WELL
- SED-17 — EXISTING SEDIMENT SAMPLING LOCATION
- 1474 — PRE-1986 MONITORING WELL
- PROPOSED SOIL BORING LOCATION [1]
- PROPOSED WELL LOCATION
- PROPOSED SURFACE SAMPLING LOCATION
- SOUTH INTERCEPTOR DITCH
- DIRT ROAD

*ALL PROPOSED LOCATIONS ARE APPROXIMATE

NOTE: [1] LOCATION MAY BE MODIFIED BASED ON RESULTS OF VISUAL INSPECTION AND RADIATION SURVEY.

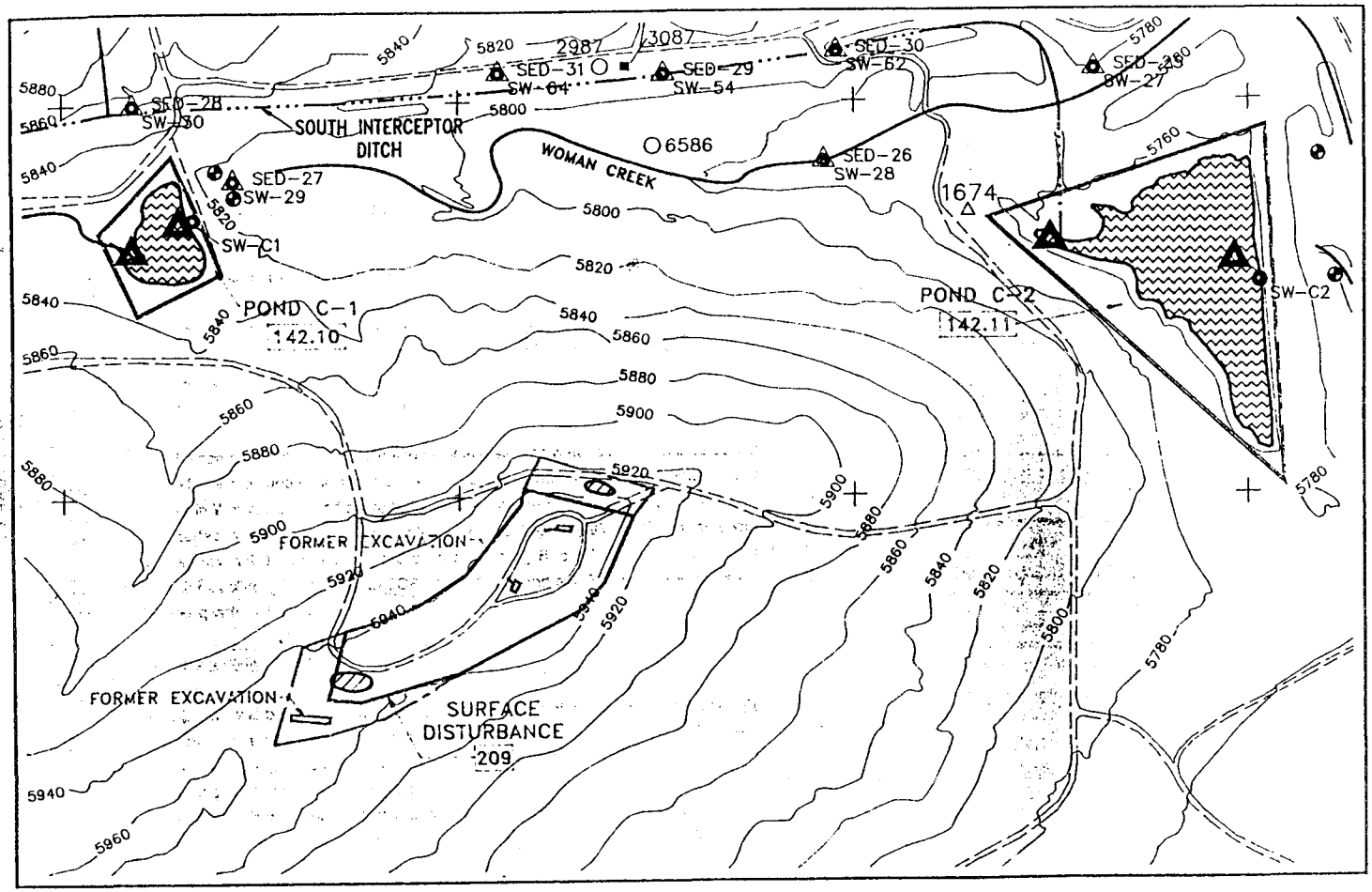
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 5
PHASE I RFI/RI WORK PLAN

PROPOSED SAMPLING & WELL LOCATIONS
IHSS 133.1-6,
ASH PITS 1-4, INCINERATOR,
CONCRETE WASH PAD, AND ADDITIONAL
SURFACE DISTURBANCE

FIGURE 13 MARCH 1991

25060110



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FOR COMMENTS AND DISCUSSION ONLY

N

0 150 300

SCALE: 1" = 300'

EXPLANATION

- INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- SW-1 EXISTING SURFACE WATER SAMPLING LOCATION
- 5786 EXISTING ALLUVIAL GROUNDWATER MONITORING WELL
- SED-17 EXISTING SEDIMENT SAMPLING LOCATION
- 3087 EXISTING BEDROCK GROUNDWATER MONITORING WELL
- PONDLIKE DEPRESSION
- SOUTH INTERCEPTOR DITCH
- DIRT ROAD
- PRELIMINARY EXTENSION OF THE SURFACE DISTURBANCE BASED ON A SITE RECONNAISSANCE
- PROPOSED WELL LOCATION *
- PROPOSED SEDIMENT SAMPLING LOCATION **

**3 OTHER LOCATIONS IN EACH POND WILL BE SELECTED AT RANDOM

*ALL PROPOSED LOCATIONS ARE APPROXIMATE

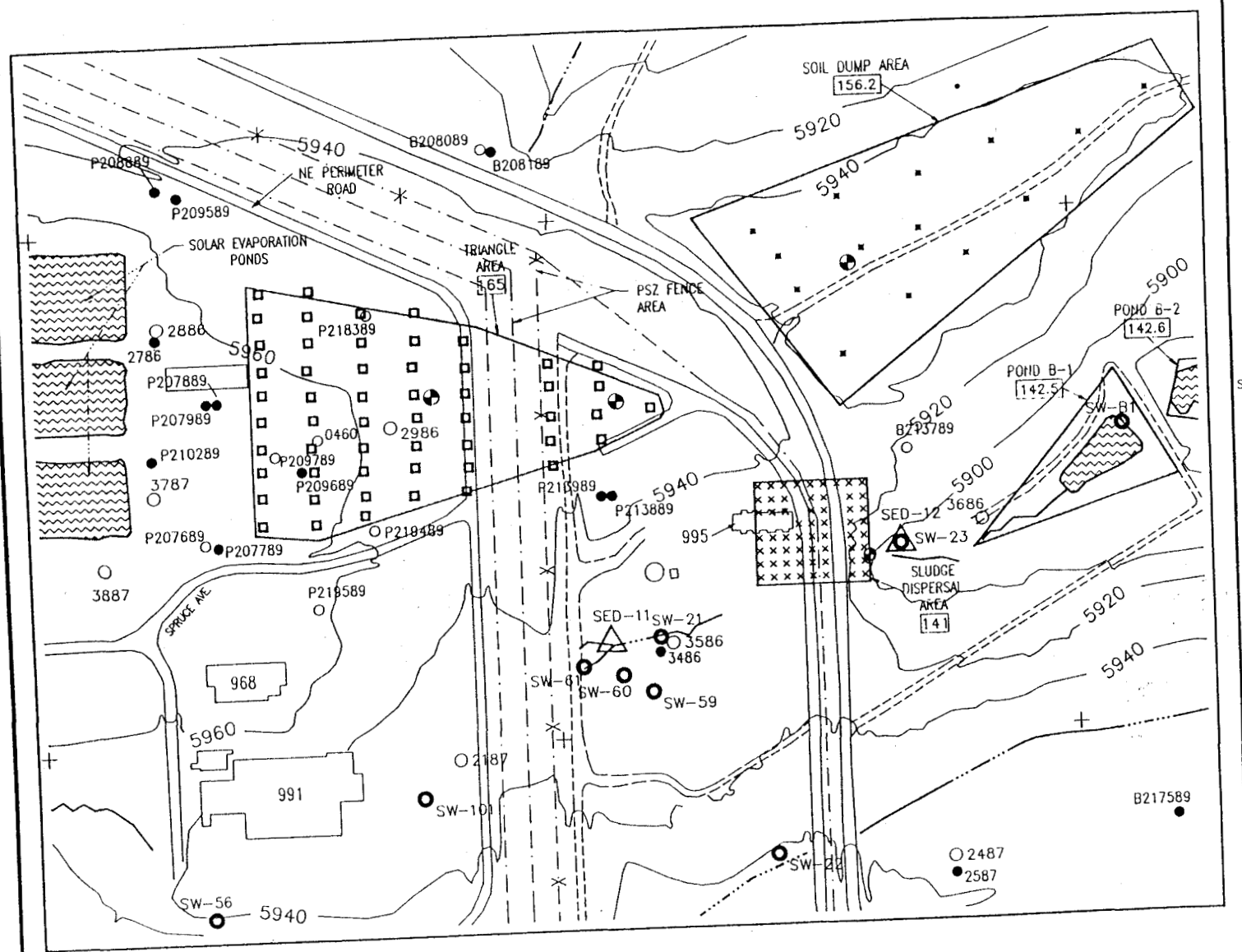
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 5
PHASE I RFI/RI WORK PLAN

PROPOSED SAMPLING & WELL LOCATIONS
IHSS 142.10-1
PONDS C-1 AND C-2
IHSS 209 SURFACE DISTURBANCE
SOUTHEAST OF BLDG. 881

FIGURE 14 MARCH 1991

25060120



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N

0 100 200

SCALE: 1" = 200'

EXPLANATION

- [115] INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- SW-1 EXISTING SURFACE WATER SAMPLING LOCATION
- 5786 EXISTING ALLUVIAL GROUNDWATER MONITORING WELL
- SED-17 EXISTING SEDIMENT SAMPLING LOCATION
- 3087 EXISTING BEDROCK GROUNDWATER MONITORING WELL
- DIRT ROAD
- INTERMITTENT STREAM
- [968] ROCKY FLATS BLDG. NO.
- PROPOSED SOIL GAS SURVEY LOCATION[1]
- PROPOSED WELL LOCATION[1]
- × PROPOSED SURFACE SAMPLING LOCATION[1]
- PROPOSED BORING AND SURFACE SAMPLING LOCATION[1]

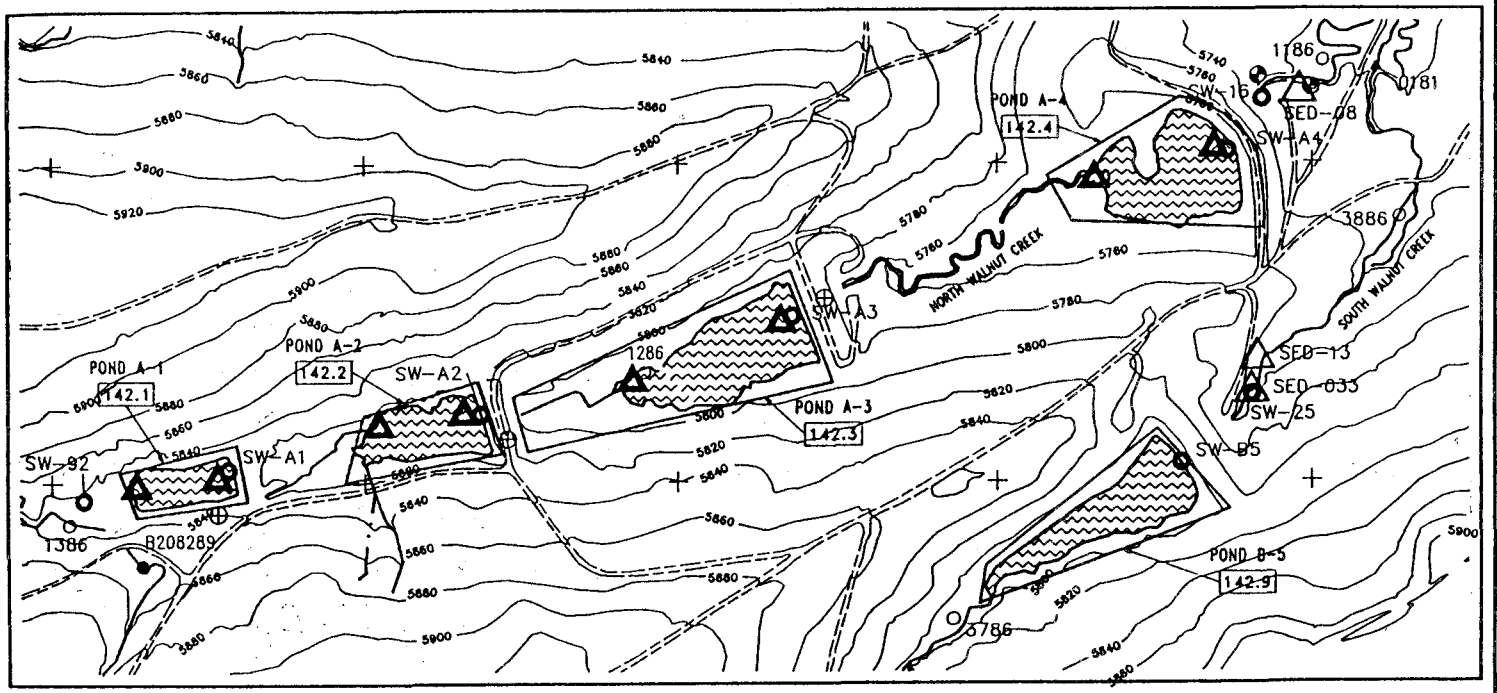
[1] ALL PROPOSED LOCATIONS ARE APPROXIMATE

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 6
PHASE I RFI/RI WORK PLAN

PROPOSED SAMPLING AND WELL LOCATIONS IHSS 141 SLUDGE DISPERSAL IHSS 165 TRIANGLE AREA IHSS 156.2 SOIL DUMP AREA

FIGURE 15 APRIL 1991



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FOR COMMENTS AND DISCUSSION ONLY

N

0 200 400

SCALE: 1" = 400'

EXPLANATION

- 115 — INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- SW-1 — EXISTING SURFACE WATER SAMPLING LOCATION
- 5786 — EXISTING ALLUVIAL GROUNDWATER MONITORING WELL
- SED-17 — EXISTING SEDIMENT SAMPLING LOCATION
- 3087 — EXISTING BEDROCK GROUNDWATER MONITORING WELL
- 0181 — EXISTING PRE-1986 WELL
- INTERMITTENT STREAM
- DIRT ROAD
- PROPOSED WELL LOCATION[1]
- PROPOSED SEDIMENT SAMPLE LOCATION[1]
- PROPOSED BEDROCK WELL LOCATIONS FOR SITE-WIDE GEOLOGICAL CHARACTERIZATION PROGRAM[1]

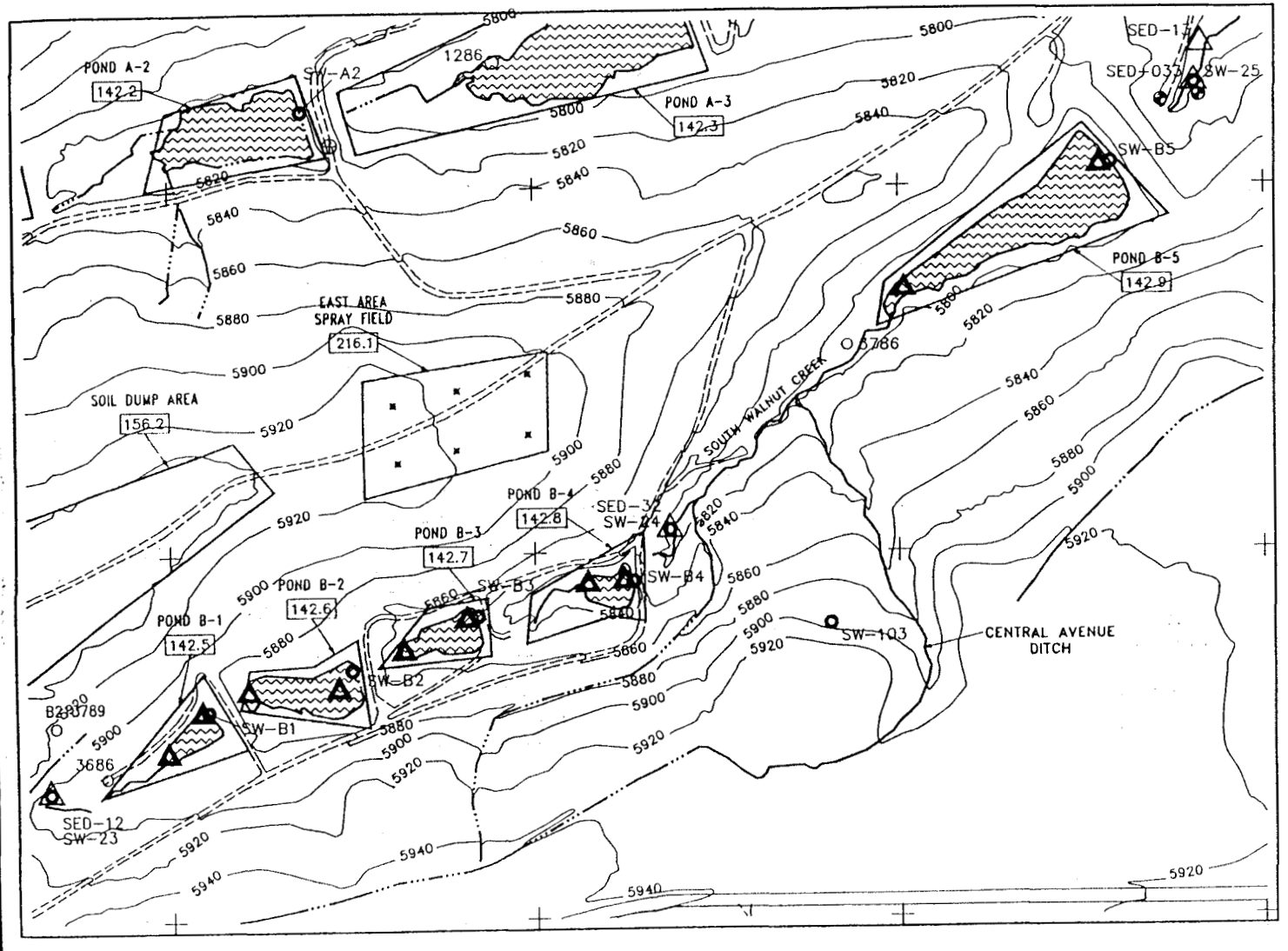
[1] ALL PROPOSED LOCATIONS ARE APPROXIMATE

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 6
PHASE I RFI/RI WORK PLAN

PROPOSED SAMPLING & WELL LOCATIONS
IHSSs 142.1-4
A-SERIES DETENTION PONDS
ALONG NORTH WALNUT CREEK

FIGURE 16 APRIL 1991



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FOR COMMENTS AND DISCUSSION ONLY

N

0 150 300

SCALE: 1" = 300'

EXPLANATION

- 115 — INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- SW-1 — EXISTING SURFACE WATER SAMPLING LOCATION
- 5786 — EXISTING ALLUVIAL GROUNDWATER MONITORING WELL
- SED-17 — EXISTING SEDIMENT SAMPLING LOCATION
- INTERMITTENT STREAM
- DIRT ROAD
- 968 — ROCKY FLATS BLDG. NO.
- PROPOSED WELL LOCATION [1]
- PROPOSED BORING AND SURFACE SAMPLE LOCATION [1]
- PROPOSED SEDIMENT SAMPLE LOCATION [1,2]
- PROPOSED BEDROCK WELL LOCATIONS FOR SITE-WIDE GEOLOGICAL CHARACTERIZATION PROGRAM [1]

[1] ALL PROPOSED LOCATIONS ARE APPROXIMATE

[2] THREE OTHER LOCATIONS IN EACH POND WILL BE SELECTED AT RANDOM

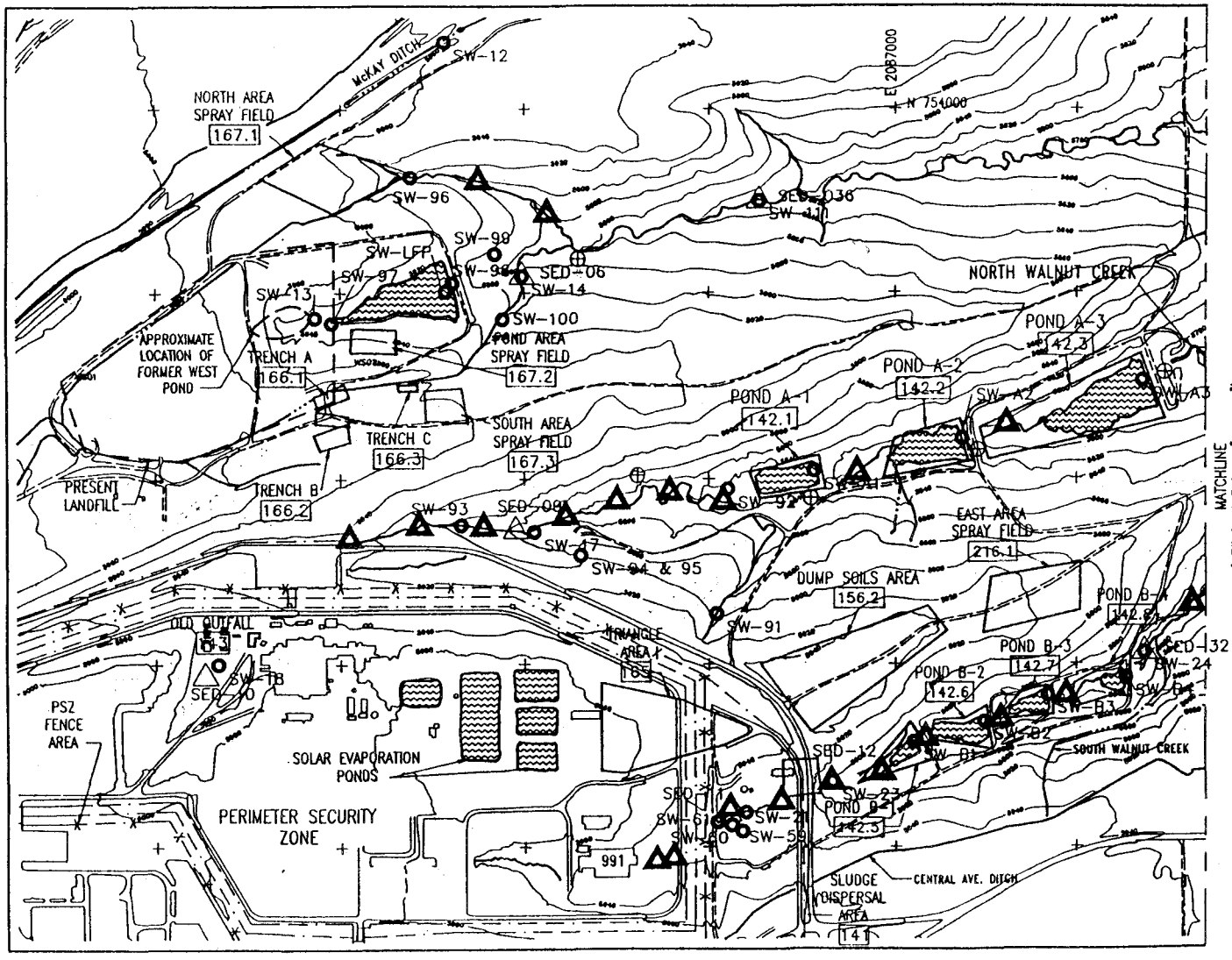
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 6
PHASE I RFI/RI WORK PLAN

PROPOSED SAMPLING & WELL LOCATIONS
IHSSs 142.5-9,
B-SERIES DETENTION PONDS
ALONG SOUTH WALNUT CREEK
IHSS 216.1 EAST AREA SPRAY FIELD

FIGURE 17 APRIL 1991

7-3



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FOR COMMENTS AND DISCUSSION ONLY

N

0 300 600

SCALE: 1" = 600'

EXPLANATION

- INDIVIDUAL HAZARDOUS SUBSTANCE SITE (IHSS) IN OPERABLE UNIT 6
- 115 — IHSS REFERENCE NUMBER
- SW-1 — EXISTING SURFACE WATER SAMPLING LOCATION
- SED-17 — EXISTING SEDIMENT SAMPLE LOCATION
- PERIMETER SECURITY ZONE
- DIRT ROAD
- PROPOSED LOCATIONS FOR SEDIMENT SAMPLES[1]
- PROPOSED BEDROCK WELL LOCATIONS FOR SITE-WIDE GEOLOGICAL CHARACTERIZATION PROGRAM[1]

[1] ALL PROPOSED LOCATIONS ARE APPROXIMATE

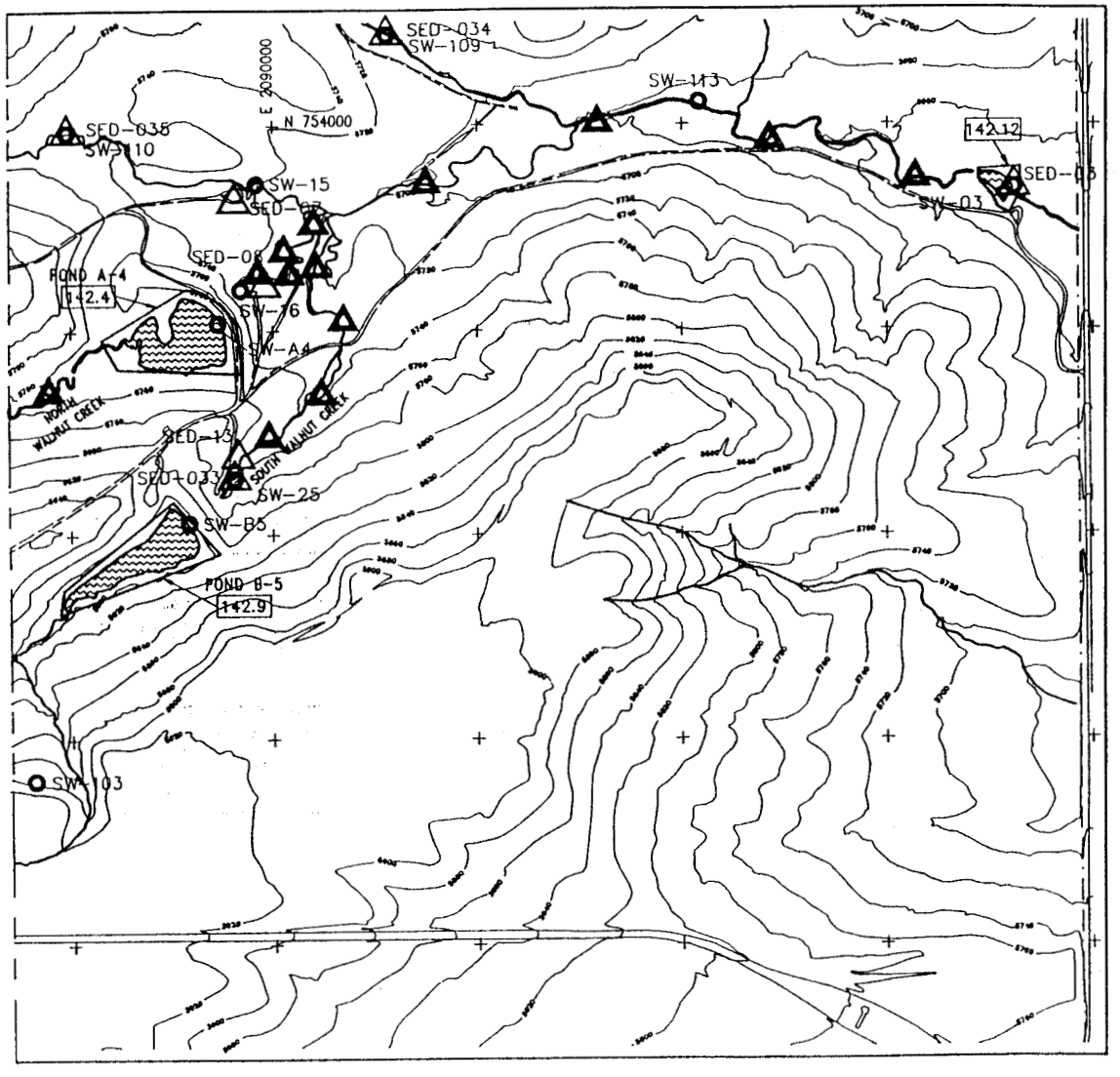
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 6
PHASE I RFI/RI WORK PLAN

SEDIMENT SAMPLING SITES AND SITE-WIDE PROGRAM BEDROCK WELLS ON NORTH AND SOUTH WALNUT CREEKS

FIGURE 18d (1 OF 2) APRIL 1991

7-4A



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FOR COMMENTS AND DISCUSSION ONLY

N

0 300 600

SCALE: 1" = 600'

EXPLANATION

- INDIVIDUAL HAZARDOUS SUBSTANCE SITE (IHSS) IN OPERABLE UNIT 6
- 115 — IHSS REFERENCE NUMBER
- SW-1 — EXISTING SURFACE WATER SAMPLING LOCATION
- SED-17 — EXISTING SEDIMENT SAMPLE LOCATION
- DIRT ROAD
- PROPOSED LOCATIONS FOR SEDIMENT SAMPLES[1]

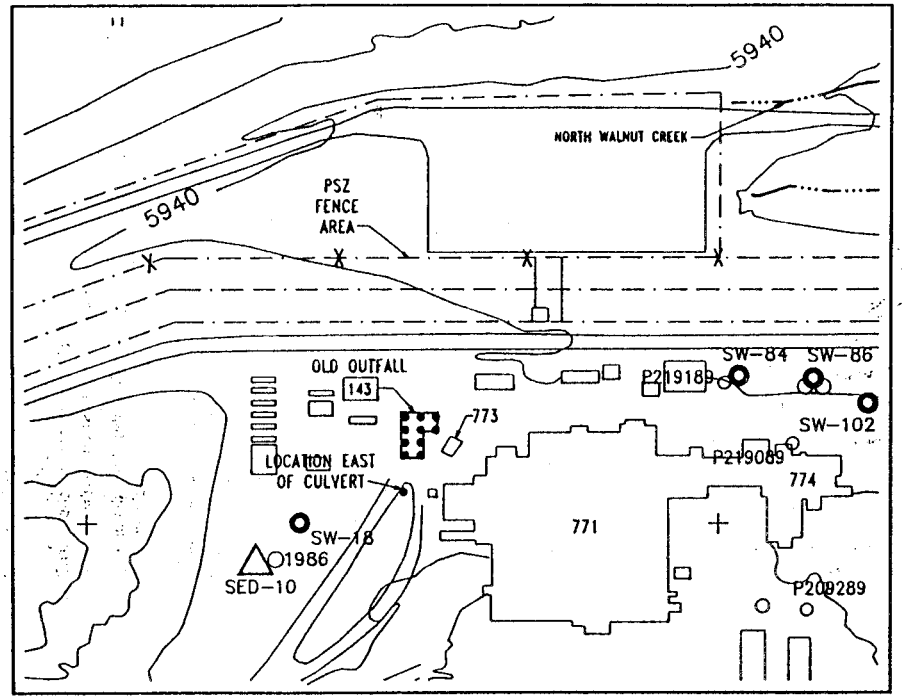
[1] ALL PROPOSED LOCATIONS ARE APPROXIMATE

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 6
PHASE I RFI/RI WORK PLAN

SEDIMENT SAMPLING SITES AND SITE-WIDE PROGRAM BEDROCK WELLS ON NORTH AND SOUTH WALNUT CREEKS

FIGURE 18b (2 OF 2) APRIL 1991



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FOR COMMENTS AND DISCUSSION ONLY

N

0 100 200

SCALE: 1" = 200'

EXPLANATION

- 115 — INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- SW-1 — EXISTING SURFACE WATER SAMPLING LOCATION
- 5786 — EXISTING ALLUVIAL GROUNDWATER MONITORING WELL
- SED-17 — EXISTING SEDIMENT SAMPLING LOCATION
- INTERMITTENT STREAM
- DIRT ROAD
- 968 — ROCKY FLATS BLDG. NO.
- PROPOSED SOIL BORING LOCATION[1]

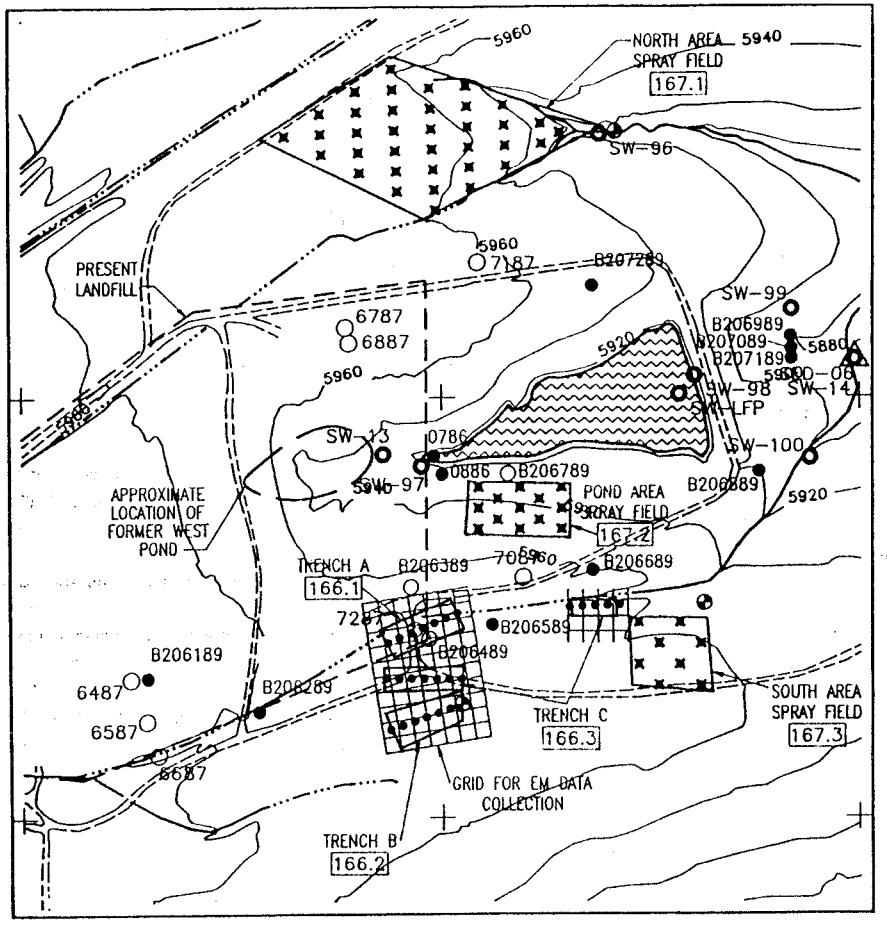
[1] ALL PROPOSED LOCATIONS ARE APPROXIMATE

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 6
PHASE I RFI/RI WORK PLAN

PROPOSED SAMPLING LOCATIONS
IHSS 143 OLD OUTFALL AREA

FIGURE 19 APRIL 1991



DRAFT

FOR COMMENTS AND DISCUSSION ONLY

N

0 150 300

SCALE: 1" = 300'

EXPLANATION

- 115 — INDIVIDUAL HAZARDOUS SUBSTANCE SITE
- SW-1 — EXISTING SURFACE WATER SAMPLING LOCATION
- 5786 — EXISTING ALLUVIAL GROUNDWATER MONITORING WELL
- SED-17 — EXISTING SEDIMENT SAMPLING LOCATION
- 3087 — EXISTING BEDROCK GROUNDWATER MONITORING WELL
- INTERMITTENT STREAM
- DIRT ROAD
- PROPOSED SOIL BORING LOCATION [1]
- PROPOSED WELL LOCATION [1]
- PROPOSED BORING AND SURFACE SAMPLE LOCATION [1]
- PROPOSED ELECTROMAGNETIC SURVEY LINE LOCATION [1]

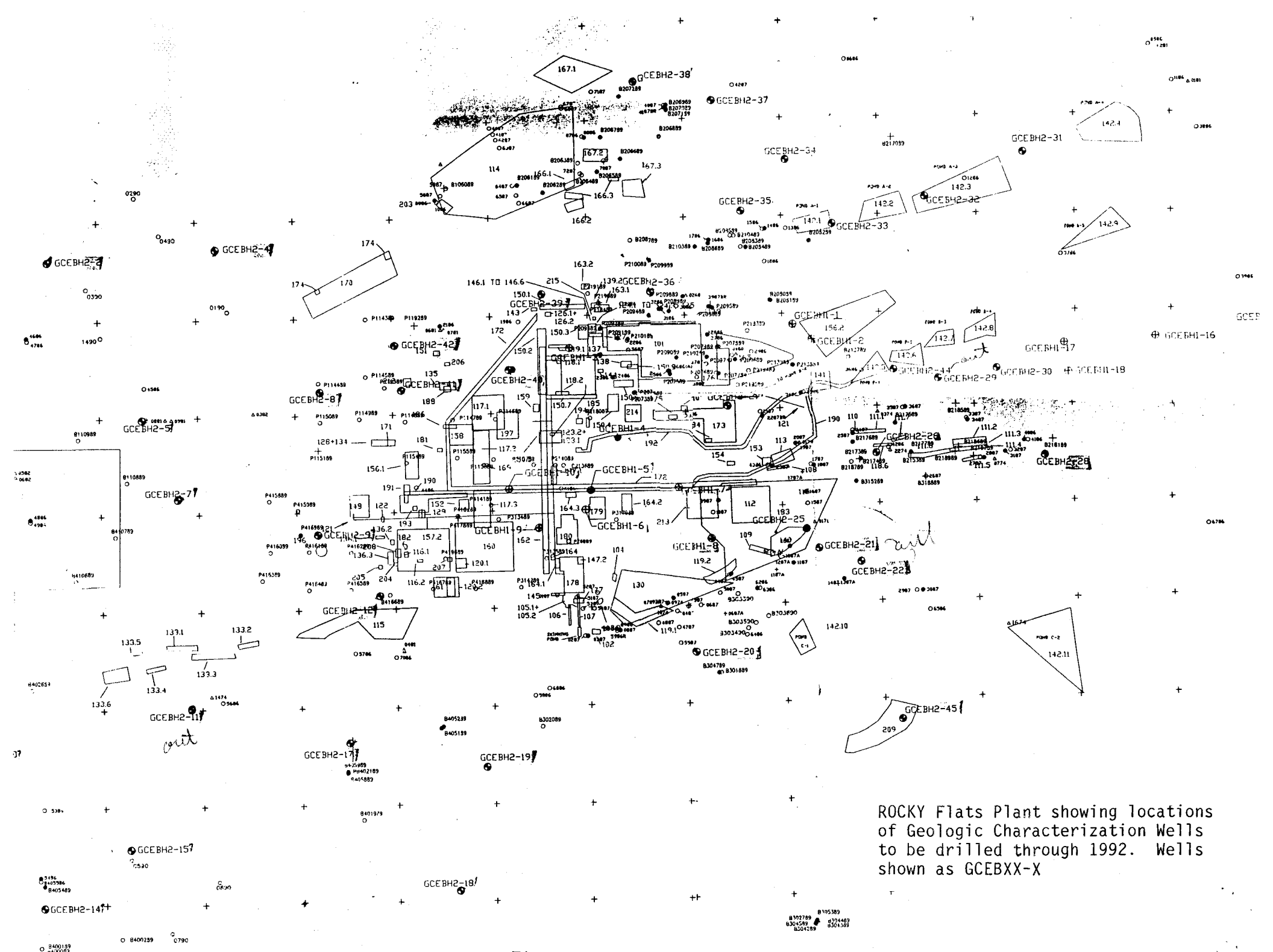
[1]ALL PROPOSED LOCATIONS ARE APPROXIMATE

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 6
PHASE I RFI/RI WORK PLAN

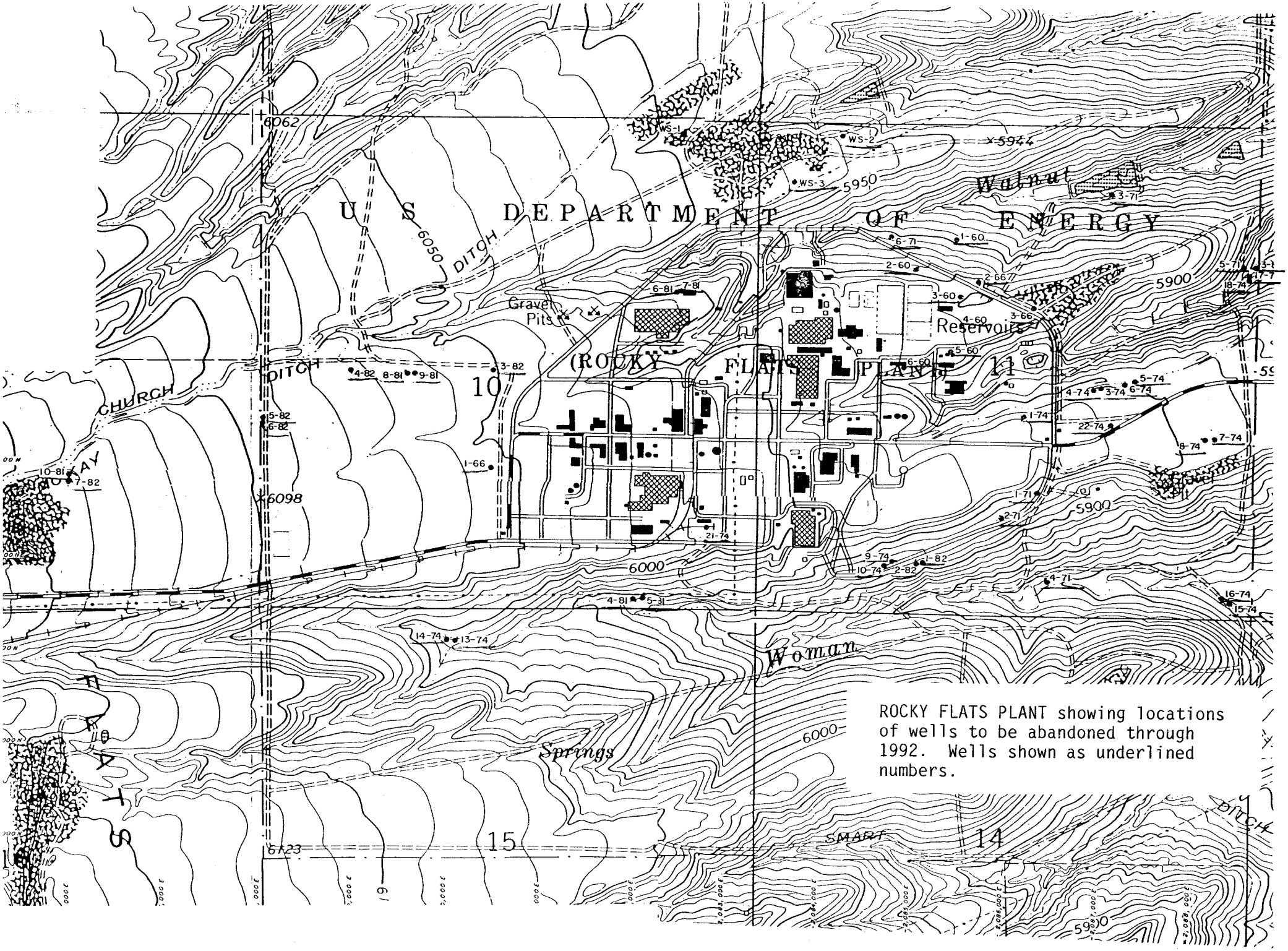
PROPOSED SAMPLING & WELL LOCATIONS
IHSSs 166.1-3, TRENCHES A, B, & C
IHSSs 167.1-3 NORTH AREA,
POND AREA AND SOUTH AREA

FIGURE 20 APRIL 1991



ROCKY Flats Plant showing locations of Geologic Characterization Wells to be drilled through 1992. Wells shown as GCEBXX-X

Figure 21



ROCKY FLATS PLANT showing locations of wells to be abandoned through 1992. Wells shown as underlined numbers.

Figure 22

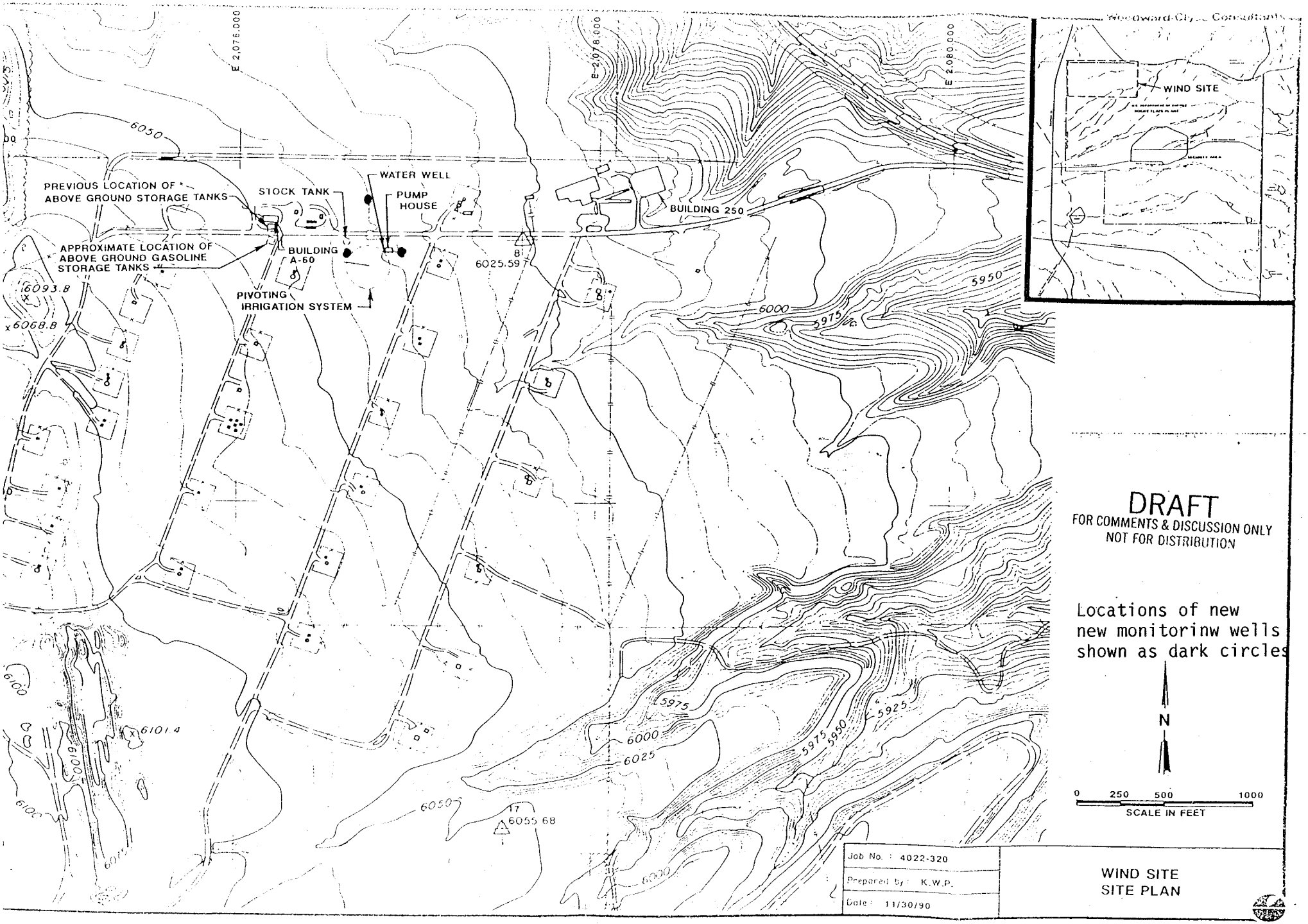
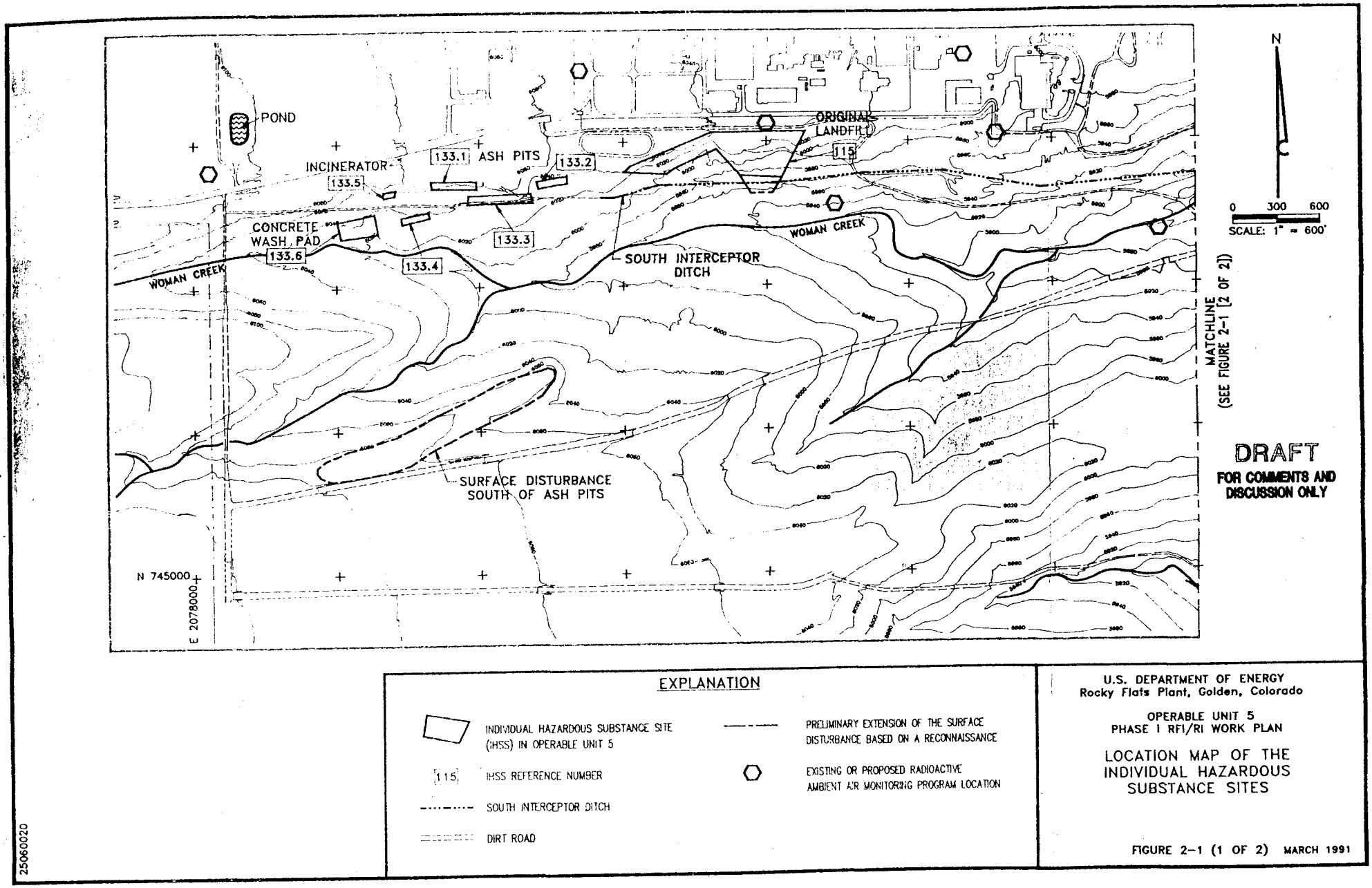

E 2,076,000
E 2,078,000
E 2,080,000
6050
PREVIOUS LOCATION OF ABOVE GROUND STORAGE TANKS
STOCK TANK
WATER WELL
PUMP HOUSE
BUILDING 250
APPROXIMATE LOCATION OF ABOVE GROUND GASOLINE STORAGE TANKS
BUILDING A-60
6025.59
PIVOTING IRRIGATION SYSTEM
6093.8
6068.8
6000
5975
5950
6101.4
6100
6075
6025
5925
6055.68
WIND SITE
DRAFT
FOR COMMENTS & DISCUSSION ONLY
NOT FOR DISTRIBUTION
Locations of new
new monitorinw wells
shown as dark circles
N
0 250 500 1000
SCALE IN FEET
Job No. : 4022-320
Prepared by: K.W.P.
Date : 11/30/90
WIND SITE
SITE PLAN
FIG. 1

Figure 23


POND
INCINERATOR
133.5
133.1 ASH PITS
133.2
ORIGINAL LANDFILL
115
CONCRETE WASH PAD
133.6
133.3
133.4
WOMAN CREEK
WOMAN CREEK
SOUTH INTERCEPTOR DITCH
SURFACE DISTURBANCE SOUTH OF ASH PITS
N 745000
E 2078000
N
0 300 600
SCALE: 1" = 600'
MATCHLINE (SEE FIGURE 2-1 [2 OF 2])
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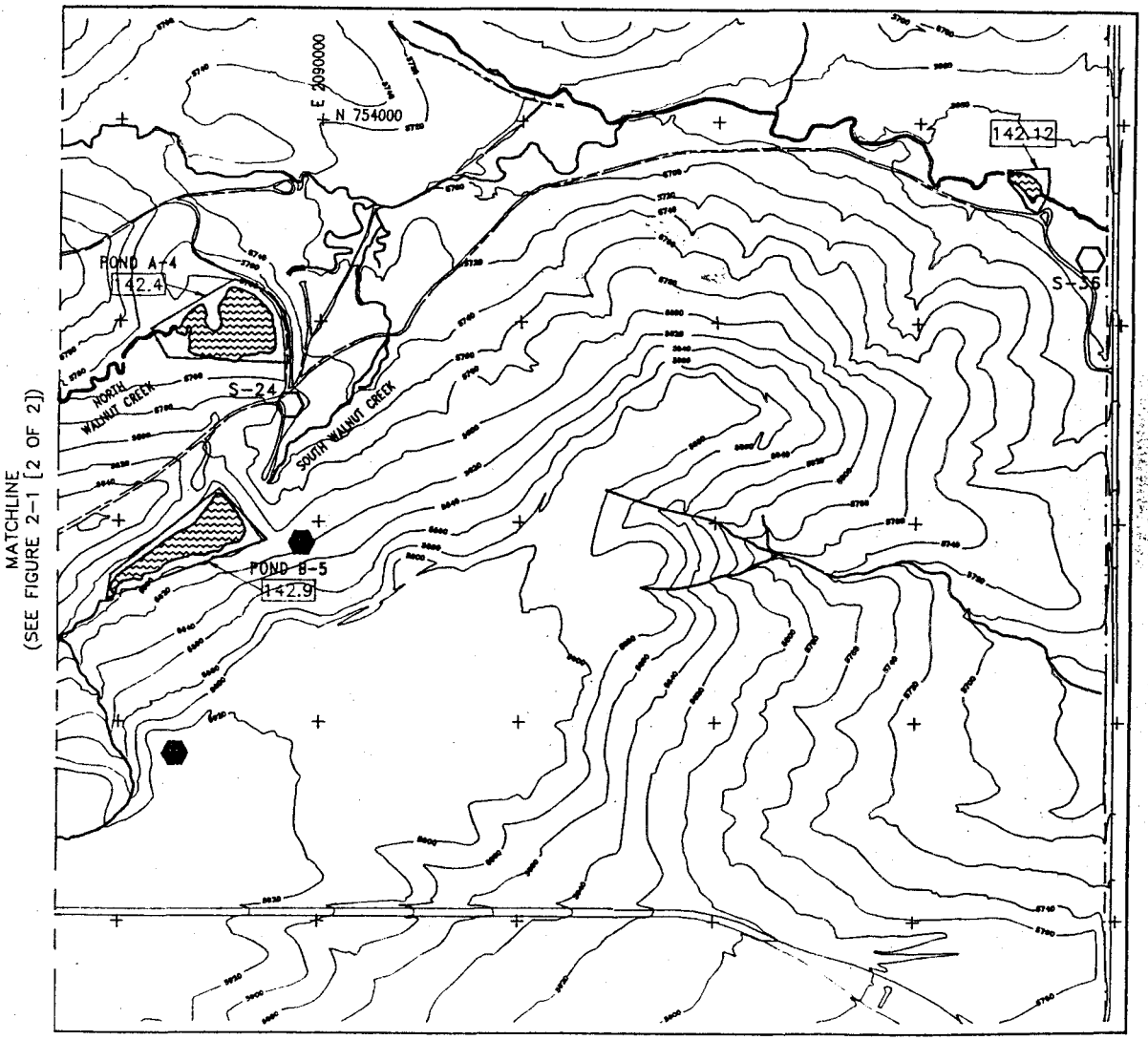
FOR COMMENTS AND DISCUSSION ONLY
EXPLANATION
INDIVIDUAL HAZARDOUS SUBSTANCE SITE (IHSS) IN OPERABLE UNIT 5
115 IHSS REFERENCE NUMBER
SOUTH INTERCEPTOR DITCH
DIRT ROAD
PRELIMINARY EXTENSION OF THE SURFACE DISTURBANCE BASED ON A RECONNAISSANCE
EXISTING OR PROPOSED RADIOACTIVE AMBIENT AIR MONITORING PROGRAM LOCATION
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado
OPERABLE UNIT 5
PHASE I RFI/RI WORK PLAN
LOCATION MAP OF THE INDIVIDUAL HAZARDOUS SUBSTANCE SITES
FIGURE 2-1 (1 OF 2) MARCH 1991
25060020

FIGURE 24



DRAFT
FOR COMMENTS AND DISCUSSION ONLY

N

0 300 600
SCALE: 1" = 600'

EXPLANATION

- INDIVIDUAL HAZARDOUS SUBSTANCE SITE (IHSS) IN OPERABLE UNIT 6
- 115 IHSS REFERENCE NUMBER
- ===== DIRT ROAD
- EXISTING RADIOACTIVE AMBIENT AIR MONITORING PROGRAM LOCATION
- PROPOSED RADIOACTIVE AMBIENT AIR MONITORING PROGRAM LOCATION

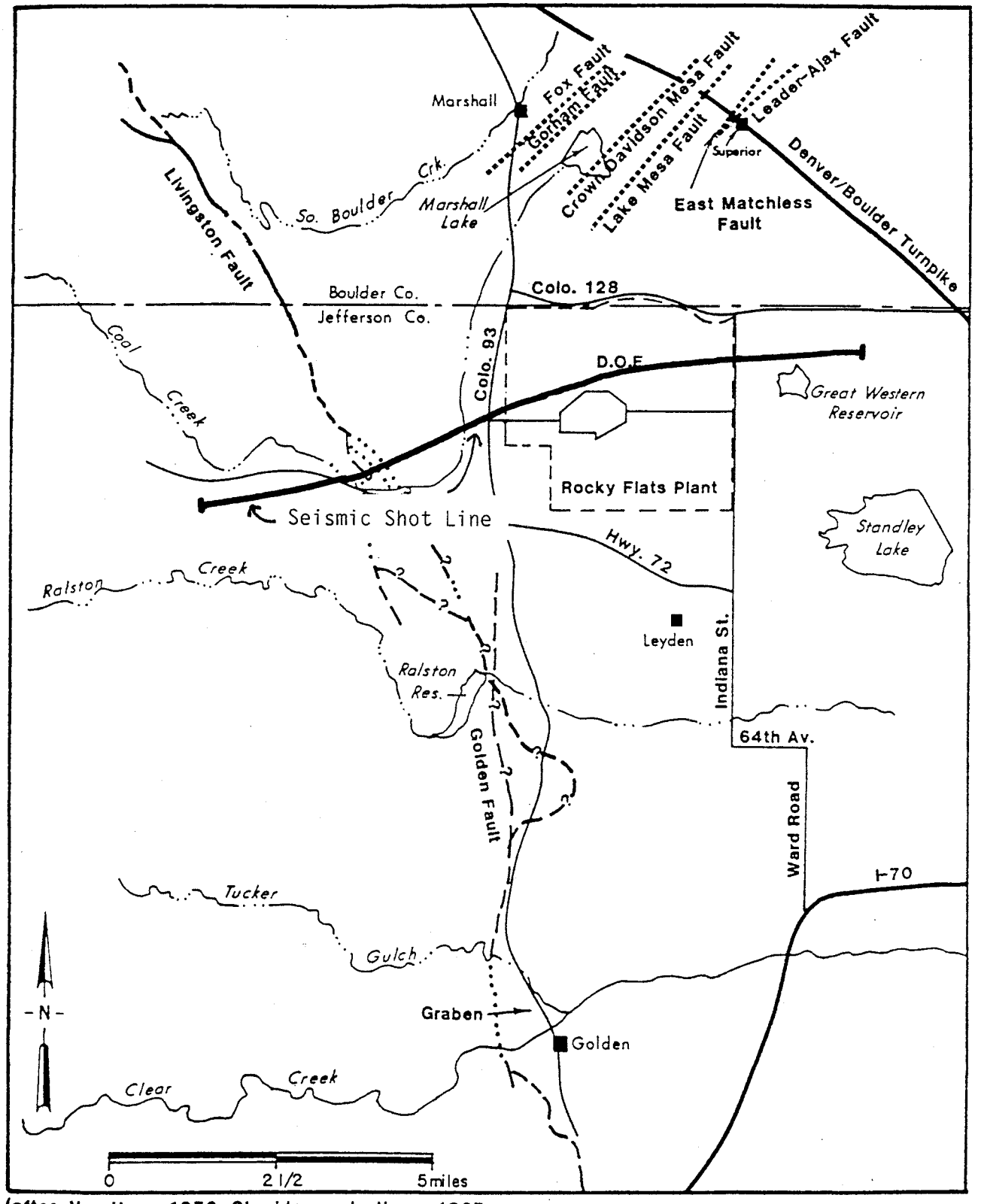
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT 6
PHASE I RFI/RI WORK PLAN

LOCATION MAP OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES NORTH AND SOUTH WALNUT CREEKS

APRIL 1991

FIGURE 25



(after: Van Horn, 1972, Sheridan and others, 1967, Wells, 1967, and Spencer, 1961)

Fault Locations Between Golden and Marshall, Colorado (excluding Eggleston Fault)

FIGURE 26

EBASCO

FIGURE 26